A CASE STUDY OF THE ENVIRONMENTAL GROWTH AND DEVELOPMENT OF THE GRUMMAN AIRCRAFT ENGINEERING CORPORATION AS A COMPONENT OF THE NAVAL INDUSTRIAL SHORE ESTABLISHMENT

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by

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A thesis submitted in partial fulfillment of the
requirements for the degree of
Master of Science in Engineering from
Princeton University, 1956

Grumman Photo

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PREFACE

The authors, as officers of the Civil Engineer Corps, United States Navy, have for the past year been engaged in a program of graduate study at Princeton University. This thesis is the product of their mutual interest in the field of industrial planning.

In an attempt to gain a better understanding of the growth factors and development inter-relationships peculiar to the Naval Shore Establishment and its adjacent communities, the authors chose as a case study the growth and environmental development of the Grumman Aircraft Engineering Corporation in the Long Island area.

The subject is introduced with a brief historical treatment of the Naval Shore Establishment, followed by detailed coverage of the social and economic growth of Nassau and Suffolk Counties to provide the necessary background. Attention is then focused upon Grumman and its development from a rudimentary organization occupying a converted garage to a multi-million dollar industrial enterprise. Factors necessitating expansion of the company to eastern Long Island, and how this expansion was effected, are examined. In the concluding portions of the thesis, the authors point out basic relationships and suggest possible solutions to the problem of airfield-community development.

The methodology, or description of the authors' approach to this study, is presented in the appendices.

R.J.K. and H.P.C.

Princeton University
May, 1956

ACKNOWLEDGMENTS

The authors are sincerely indebted to the following, without whose assistance this study would not have been possible:

Vice Admiral W. Mack Angas, CEC, USN (Ret.), Chairman of the Department of Civil Engineering, Princeton University, for his interest, guidance, advice and encouragement.

Dr. Gerald Breese, Director, Bureau of Urban Research, Princeton University, for his guidance and counsel.

The Bureau of Yards and Docks and the Bureau of Aeronautics, Department of the Navy, for the opportunity to conduct this study, and for the direct assistance rendered by their personnel.

The Grumman Aircraft Engineering Corporation for its generous cooperation and assistance.

The District Public Works Officer, Third Naval District, for providing access to appropriate files, and for the helpful assistance of the office personnel.

Mr. James L. Niland, Brooklyn, New York, for his contributions in the field of real estate valuation.

Mr. James W. Carpenter, Vice President, Long Island Lighting Company, for providing population data.

The Department of Commerce, New York State, for the invaluable assistance of its field offices.

The Department of Labor, New York State, for its cooperation.

The Nassau County Planning Commission for its interest and assistance.

The Suffolk County Planning Board for its interest and assistance.

Mr. Fred Tilney, President, Governmental Statistical Corporation, for his interest and generous cooperation.

Dr. Bayard Q. Morgan, Stanford, California, for his generous editorial assistance.

Mr. H. P. Cahill Sr. for his keen interest and intermedial services.

Katherine and Margaret, our wives, for their encouragement, cheerful assistance, and patience during the many months that we have been "pre-occupied" with our studies.

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INTRODUCTION

Frequently one meets those who have developed certain misconceptions concerning the relationship between the military and civilian community. Some look upon the naval station as their private hunting ground which the Great White Father has thoughtfully stocked with thousands of no-money-down, 30-months-to-pay charge accounts. Others, less carnivorous, think that the security fence, sentries, and "No Trespassing" signs evidence a basically anti-social attitude of the inmates. There are those who look upon themselves as wards of the State and expect to be nurtured in a G.I. vacuum untouched by the responsibilities and problems imposed by a civilian community. Then there are those who, overburdened by responsibility, insist that their particular organization be independently prepared for any eventuality. When the relief makes his first inspection, he finds, to his bewilderment, an industrial complex capable of manufacturing on ten minutes' notice one of everything on the station.

These are oversimplifications, of course, but they serve to illustrate certain aspects of the dynamic relationship between a naval installation and its supporting community. Industrial in character, naval facilities have always been dependent upon the nearby community as a source of labor, housing, and the normal services essential to any industrial plant. The community in turn looks to the station as a contributing member of its economic and social life. The comparatively recent presence of defense industries and aircraft facilities dispersed throughout the country (a by-product of the world situation and modern warfare as developed since 1940) has accentuated this Shore Establishment-Community relationship and

emphasized the need for a mutual understanding of each other's immediate and foreseeable requirements.

AN EARLY NAVY YARD

The global network of facilities which comprise the present Naval Shore Establishment is of relatively recent origin. It was not until 1801 that property negotiations for the first six navy yards were completed. All six were concentrated on the east coast between Norfolk, Virginia and Portsmouth, New Hampshire.

Small by today's standards, the original yards were designed to service and repair the wooden ships then in use. The Philadelphia Navy Yard, typical of the period, consisted of 11 acres and included a former commercial shipbuilding yard which had produced many of the Navy's ships up to that time. It was acquired in 1801 at a cost of $38,636. Shortly thereafter the area was increased to approximately 18 acres. Facilities, by 1822, included: two shiphouses, marine barracks, hospital, blacksmith and joiner shops, storehouses, mast shed, building slips, and sheers. Approximately 170 mechanics and laborers were employed.

The Yard kept pace with advances in warship design and by 1861 employment had grown to 1,700 mechanics and laborers. Wages reflected the emergency demand for labor, and a shipwright's pay, for example, rose that year from $1.75 to $3.00 per day. Peak employment during the Civil War was 2,686 workers. Following the war the pay roll leveled off to approximately 1,200.[1]

A significant result of the Civil War was the emergence of the

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[1] J. L. Kauffman, "Philadelphia's Navy Yards (1801-1948)" Newcomen Society Address delivered 17 January 1948.

ironclad warship. New yard layout, different plant equipment, and additional skills were required of the post-war shore facility. Philadelphia could furnish the new skilled labor, for its iron and steel industry was well developed at that time. However, the 18 acres of fully developed plant made further internal expansion impossible. Situated as it was in the heart of the city's commercial waterfront, the Yard was hopelessly strangled. Space was at such a premium that it was not unusual for warships to rent berths at nearby commercial piers while awaiting their turn at the Yard wharf.[2] Not only had the Yard become inadequate from the Navy's point of view, it also obstructed the full commercial development of the city's port facilities.

New London, Connecticut, seized this opportunity to propose that the yard be relocated there. The Governor of Rhode Island, not to be outdone, suggested that Narragansett Bay was most suited to the needs of such an establishment. Philadelphia meanwhile offered an undeveloped waterfront site of approximately 450 acres, known as League Island, to the Government for the new yard.

There followed six years of controversy among all parties concerned, and even within the Navy itself. In fact, the Commandant of the yard held the opinion that the facility was quite satisfactory as it was.[3]

After much debate Congress accepted the deed to League Island in 1868 and the new yard was commissioned. Few improvements were made during its first twenty years and it became little more than a depository for the rusting hulks of Civil War ironclads. Although the original purpose of

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[2] A. M. Johnson, "The Genesis of a Navy Yard," U. S. Naval Institute Proceedings, Vol. 81, No. 9, September 1955, p. 993.

[3] Ibid.

the League Island yard was ironship construction and repair, an inspection made in 1882 revealed that there was no plant for iron shipbuilding; no building shop for iron or wood vessels; no drydock or marine railway; no derricks or other steam powered weight lifting equipment; and no iron foundry or furnaces for heavy forging.[4]

There had been serious thought of abandoning the site until a Navy Board in 1883 recommended that the original plans be carried out. Congress authorized the construction of a drydock which was completed in 1891 under the supervision of Lieutenant Robert E. Peary, CEC, USN, who was later to discover the North Pole. It was not until World War I, however, that the Philadelphia Navy Yard regained its former position in the Shore Establishment.

SHORE ESTABLISHMENT EXPANSION

Shore facility expansion in the nineteenth century was slow, and many stations shared the same coma-like existence of the Philadelphia yard. Economy was the rule and at one point only three yards were designated to handle all ironship construction and repair. The entire Shore Establishment of 1890 consisted of 13 yards and stations, 2,605 acres of land, 439 shops, warehouses, and shiphouses, 7.18 miles of wharf line, 10 drydocks, 19 shipbuilding ways and marine railways, 150 horses and oxen. 96 officers' quarters, plus numerous office buildings and many miles of railroad and utility lines.[5]

The Spanish-American War at the turn of the century demonstrated

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[4] Ibid.

[5] U.S. Navy, Bureau of Yards and Docks Manual (1954), p. 2-3.

the many inadequacies of the Shore Establishment with the result that Congress became more responsive to the Navy's needs. A drydock construction program was initiated. A new yard was constructed at Charleston, South Carolina, and numerous coaling stations and communication stations were established in the Philippines, Guam, Cuba, and other outlying points. Generally speaking, the first thirty years of the twentieth century can best be described as a period of modernization and improvement of facilities rather than Short Establishment expansion.

The demands of World War I far exceeded the capacity of both the Short Establishment and private industry. Numerous training camps the size of large cities, new aviation facilities, submarine bases, permanent storage facilities, ship construction facilities, ordnance plants - all were constructed during the period 1910-21. Many of the special industrial plants developed to meet wartime needs were promptly scrapped at the end of hostilities.

The depression of the early 1930's and the critical situation in Europe in the later part of that decade made their impact. A program of public works construction to furnish needed employment for the jobless, followed by the Vinson Act of 1938 that provided a 20% increase in ships as well as a total of 3,000 naval aircraft, served as the means whereby the Shore Establishment and the supporting industrial organization of the nation were improved and expanded to meet the expected needs of the impending global war. Not only was it necessary to rebuild many of the gun and ammunition plants completely scrapped following World War I, but new plants were needed to manufacture military aircraft and the latest battleships and aircraft carriers.

When one considers the great demand made for special items of war, and the fact that these needs are substantially different from those of peacetime, it can be seen that the normal industrial facilities required considerable change before they could efficiently meet the needs of World War II. For example, between 1940 and 1944 approximately 1,200 industrial plants were constructed by the government. The total cost exceeded $14 billion.[6] The average time of construction for these plants varied from 18 to 24 months. The Navy's investment in these facilities exceeded $2.25 billion and included everything from the construction of shipyards and aircraft factories to the furnishing of individual items of machine tools.[7]

INDUSTRIAL RESERVE

With the conclusion of the "shooting war" a careful analysis and review was made of these government financed plants to determine which should be taken over and incorporated in the Shore Establishment as a permanent part thereof, which should be retained by the government to insure their immediate availability in the event of a future emergency, and which could be disposed of as surplus. The industrial facilities stand-by program was thus evolved.

By means of this stand-by program, industrial plants of the Navy are available to contractors for the production of ammunition, ships, aircraft, or other war goods. When such a plant is not for the time being required by the Navy, it can be leased to industry as an aid to the civilian

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[6]U.S. Code Congressional Service 1948, No. 7, 80th Congress - 2nd Session, June 23-August 16, 1948, "The National Industrial Reserve Act of 1948," p. 4386.

[7]U.S. Congress, House of Representatives, Committee on Armed Services. Subcommittee No.3, Organization, Mobilization - Subcommittee Hearings on H.R. 3471 to authorize leases of real or personal property by the War and Navy Departments, and for other purposes, 22 May 1947.

economy and thus retain its war production potential.

INDUSTRY'S DEPENDENCE UPON GOVERNMENT

Another aspect of this close tie-in of the Shore Establishment and aviation industry is the increasingly high cost of technological progress. There is a continuous and growing need for properly designed facilities to carry on the design and production of advanced types of aircraft. New fighters and bombers cost up to ten times as much as those of 1940-45, and inflation is only partly responsible. To create a new jet-propelled fighter requires elaborate testing laboratories and wind tunnels, new production tools and machinery, larger flying fields, and refined flight test equipment. The growing need for such facilities has in recent years exceeded industry's ability to obtain them. Government restrictions on the earnings of military aircraft manufacturers do not ameliorate this condition. The situation is thus creating an increasing government ownership of facilities needed and utilized by the industry.

Distinguishing the demarcation between Shore Establishment and private industry is frequently a difficult problem without the proper records, for in most instances the government constructed its facilities either inside of or adjacent to the contractor's property line.

Typical of such government expanded plants is Grumman Aircraft Engineering Corporation of Bethpage, Long Island, which has been the principal manufacturer of naval fighter aircraft throughout the past twenty-three years. A major portion of the plant was constructed by the Navy during World War II and has since been purchased by Grumman. That portion retained under government ownership is leased, and the company's entire

production schedule, with few exceptions, is dominated by Navy orders. Recent advances in jet aircraft design, coupled with the fact that the surrounding residential community has built up solidly around the plant's boundaries, have necessitated the relocation of final assembly and test operations to a more isolated site at the eastern end of Long Island. The new plant is Navy owned, leased to Grumman, and in production.

As can be seen, the pattern repeats itself. The times and details have changed, but fundamentally Grumman's situation is not unlike that of the old Philadelphia Navy Yard - environmental growth uncoordinated with the constantly expanding requirements of a technological industry. An even more important consideration is the fact that these very same forces are, with varying degrees of intensity, working upon each of the Navy's operating air stations.

This monograph is an attempt to isolate some of the significant phases of the Shore Establishment-Community relationship and evaluate their influence. The function and composition of the Naval Shore Establishment have been briefly highlighted for the purpose of orienting the Grumman Corporation within the basic structure. The succeeding chapters will trace the social, economic, and governmental characteristics of the Long Island area; the growth and development of Grumman and the aircraft industry in general; and Grumman's search for a workable solution to its immediate and foreseeable growth requirements. A summarization of the aviation industry-community relationship will be presented in the concluding chapter.

PART I

THE NAVAL SHORE ESTABLISHMENT

INTRODUCTION

Long Island, often called the bedroom of New York City, is that strip of land stretching some 120 miles east from New York into the Atlantic Ocean. The Island owes its existence to the last of the great glaciers which swept the tops off the hills of New England and deposited them some twenty miles out to sea off the southern shores of what is now Connecticut. Although born of New England soil, the Island's attachment to Manhattan across the narrow East River cast it once and for all under the spell and influence of New York City; the western fifteen miles are now actually a part of that city. The remainder of the Island is divided into Nassau and Suffolk Counties, Nassau taking the western fifteen miles, Suffolk the remaining ninety.

The two counties of Nassau and Suffolk occupy eighty-seven per cent of the land area of Long Island and have become the fastest growing areas in New York State. While these counties undoubtedly owe much of this growth to the proximity of New York City and its need for residential space to accommodate the overflow of city dwellers to the suburbs, they have their own economic base for development. The Nassau-Suffolk District has become the home of some of the largest manufacturers in the New York Metropolitan area. This development was stimulated by the industrial requirements of the Military during World War II and has continued through the post-war years. While industry in this district produces a wide range of consumer products, it is predominantly dedicated to the manufacture of aircraft and scientific instruments.

Since the beginning of World War II, the industrial growth of this area has been nothing short of phenomenal. The number of manufacturing establishments doubled and the number of production workers rose nearly

fourfold. By 1947 some 800 manufacturing firms located in the area employed over 39,000 wage and salary earners with a total payroll amounting to $115,000,000. Of this, Nassau County accounted for about 65% of the industries and over 60% of its employment.

The production of aircraft and aircraft parts is by far the major industry employing over one-third of the industrial workers of the area. Three of the leading aircraft manufacturers are located at Bethpage and Farmingdale in Nassau County, and Calverton and East Farmingdale in Suffolk County. The surrounding communities support the smaller factories producing aircraft parts and accessories.

The next largest industry is that of manufacturing scientific and engineering instruments. This accounts for some eighteen per cent of the manufacturing employment. One of the world's largest concerns dealing in precision aeronautical and marine instruments is located at Great Neck in Nassau County.

The balance of the manufacturing employment is spread through the printing industry and various consumer industries.

The Nassau-Suffolk County area as a consumer market has shown considerable growth and potential in the past decade. The tremendous population growth has resulted in expansion in retail trade to the extent of tripled total annual sales from 1939 to 1948. The total sales neared $860,000,000 in 1948, Nassau accounting for some 65% of the establishments and 70% of the sales; the per capita spending for this period was $1,003, which was less than that of New York City but higher than the rest of the state. The suburban life, the high percentage of home owners, and the relatively high income levels that characterize the area reflect in the per

capita sales by type of store with larger volume of sales in food, hardware and garden supply stores and gasoline stations than found in New York City. However, the accessibility of the city's shopping area can be credited with the relatively low per capita sales in such things as apparel and specialty goods. Within the past five years the trend toward local buying has been accelerated with the opening of branch stores by the leading New York City retailers.

While the principal mercantile shopping centers for the area are Hempstead, Rockville Centre, Freeport, and Lynbrook in Nassau County and Patchogue, Babylon, and Amityville in Suffolk County, numerable small shopping centers have developed in the last five years within or close to the large residential developments that have sprung up.

With any such concentration of population, it is essential that there be sufficient area devoted to agriculture. The farms in the district are mainly concentrated in Suffolk County. The proximity of the consumer market and demand has done much to build up this agricultural center as a truck farm area. It is to be noted that the more recent expansion of the residential populace to the east has encroached upon the once-solid farm area to the point that farmland is now being turned over to residential subdivision at lucrative rates of exchange; if the present trends in development of Nassau and Suffolk Counties continue for many more years, it is possible that the population will have to look elsewhere for the now handy foodstuffs. The Long Island duck and the potato have earned a reputation that has made Suffolk County first among the sixty-two counties of the state in value of farm produce and third in the entire nation in potato yield, while supplying almost half of the nation's ducks. The

raising of poultry and poultry products, and the acreage devoted to truck farming, with cauliflower, fresh beans, sweet corn, and cabbage as crops. make up the balance.

Some thirty-four million pounds of seafood, particularly clams, oysters, lobsters, and crabs, are marketed every season, providing sport and livelihood for the area residents.

Numerous beaches, fishing piers, golf links, and twelve state parks offer recreational facilities matched by few areas in the country. The easy access to this playground makes it possible for thousands of New York City dwellers to throng into Nassau and Suffolk Counties each summer; in 1948 the hotel receipts alone totaled $9,300,000 from approximately 157 hotels located throughout the area.

GEOGRAPHY AND TOPOGRAPHY

The very geography and topography of Long Island have contributed a great deal to its growth and development. Because it is long and narrow, main thoroughfares and routes of transportation grew longitudinally; even today there are few first-rate roads traversing the island from north to south. It was only natural that the first settlements should be located on the natural harbors that exist along both the north and south shores. In the early days of settlement, which began before the Revolutionary War, the area was devoted to fishing villages on the coast and farm land in the interior. The advent of modern means of transportation, starting with the construction of the Long Island Railroad in 1834 as a main link in transportation to Boston from New York, and the construction of roads to handle the automobile in the early nineteen-

hundreds, broke this pattern, so that today the area is laced with a road network that makes travel time between any two spots in Nassau and Suffolk Counties a matter of hours and minutes rather than days.

The topography of the island is generally constant from east to west, or longitudinally. With the melting of the last of the glaciers and the formation of the island, the greater mass of the material was deposited along the north shore, that which was washed toward the sea forming a relatively flat plain. The island can be divided into three areas from a topographical standpoint: the north shore consists of high sand hills sloping steeply to the north into the Sound from the glacial ridge, and to the south and the flat plain. This high, relatively hilly strip runs east and west and is not over five to seven miles wide. The south shore consists of a flat, sandy plain sloping gently to the Atlantic Ocean. This plain runs east and west and occupies all the area to the south of the glacial ridge slope and never more than just a few feet above sea level, some areas in the eastern part of Suffolk County being almost at sea level. The third area is that made up of the two points, Orient and Montauk, that give the eastern end of the island the appearance of a two-pronged fork. Both Orient to the north and Montauk to the south are irregular in contour.

The areas of the north shore and both of the points have long been the location of restricted residential development, especially in those places bordering on any of the natural harbors and bays. This restricted growth in the most desirable areas has begun to weaken under the pressure of today's demand for suburban residential land, and many of the famous old estates have given way to subdivision. The map in Figure 1 shows the

general geography and topography of Long Island.

Long Island lies between the zones of average summer temperature of 70° - 75°. Average winter temperature is between 25° and 35°. The prevailing summer winds are from the SW. and the prevailing winter winds are from the NW. The area is subjected to occasional tropical hurricanes, which have caused considerable damage at various times in the island's history. The average number of days in the growing season is 200.

Annual rainfall averages 42 inches, except in years when a series of tropical storms passes up the eastern coast of the United States; then it may reach 60 inches.

Relative humidity for the area is 66 in the summer and 65 in the winter.

Although soil conditions vary throughout the island, in general the upper forty to fifty feet consist of coarse sand and gravel, with boulders in the hilly sections and clay at the shores where marsh lands exist. The agricultural topsoil varies in depth, and at some places it is nonexistent.

Natural vegetation in the hilly areas is second and third-growth oak with some hickory and poplar, while in the flat and relatively low areas it consists of scrub oak and pine.

Natural drainage is good, except in certain low and marshy areas; however, these are not of sufficient size or number to have materially affected development of the island.

For the purposes of this study, the area of primary interest is limited to that portion of Long Island contained between the westerly boundary of Nassau County and a line drawn north and south across the Island

at a point five miles to the east of the community of Riverhead. See Figure 1. Our area, then, includes all of Nassau County and the major portion of Suffolk County. The area of Suffolk County not contained is of such a character as to have no effect in the conclusions to be drawn. The remainder of the island is that portion lying within the limits of New York City; its pressures and effects on the area under study will be discussed only briefly, for little can be gained by a detailed analysis in this presentation. However, in order to understand their complexities and the problems facing the area in which Grumman exerts an influence, it will be necessary to structure in detail the physical, economic, and social characteristics of the two counties.

NASSAU COUNTY

Nassau County was first settled in 1643 by a group of colonists from Stamford, Connecticut, just across the Sound to the north. These settlers purchased a strip of land from the Indians approximately ten miles wide running across the island from the Sound to the Atlantic Ocean. Although expanded slightly, the present county encompasses this original area. The name Nassau was derived from "Nassau Land," once the legal name of all of Long Island.

With the establishment of the counties of the New York Colony in 1630, Nassau came under Queens County to the west and remained so until 1899. At that time the separate county of Nassau was formed in order to preserve the concept of "Home Rule," since Queens County was being made a part of New York City. The basic tenets of "Home Rule" have continued to dominate the county government and its development to the present day.

GOVERNMENT

Nassau County is subdivided into three basic townships; in order of physical size these are Oyster Bay, Hempstead, and North Hempstead. The townships are further divided into incorporated and unincorporated areas or communities. There are sixty-six incorporated villages and areas and two individual cities. Superimposed on this are the separate school districts. The map in Figure 2 shows the limits, location, and relative physical sizes of the entities involved.

The County Government performs over-all services: Public Health, Welfare, Police, Planning, Public Works, Fire Protection, Hospitals, Parks, etc.

Headed by the elected County Executive, its governing body is the Board of Supervisors elected from each of the three towns of Oyster Bay, Hempstead, and North Hempstead and from the two cities of Glen Cove and Long Beach. This Board passes county legislation and confirms appointments of the County Executive. Other elected officials are the Comptroller, the Sheriff, the District Attorney, and the County Clerk. All judges are elected and must be attorneys.

Town officials are elected by the people: Supervisor (two in the town of Hempstead), four Councilmen, Superintendent of Highways, Receiver of Taxes, Town Clerk, and (in Hempstead only) a Treasurer. The Town Board, composed of supervisors and councilmen, legislates for the unincorporated area (now housing the bulk of the population) outside the villages. They establish zoning and other ordinances, set up boards of zoning appeal, maintain supervision over special districts and various departments of the town. The town handles those services which are best provided on a town-

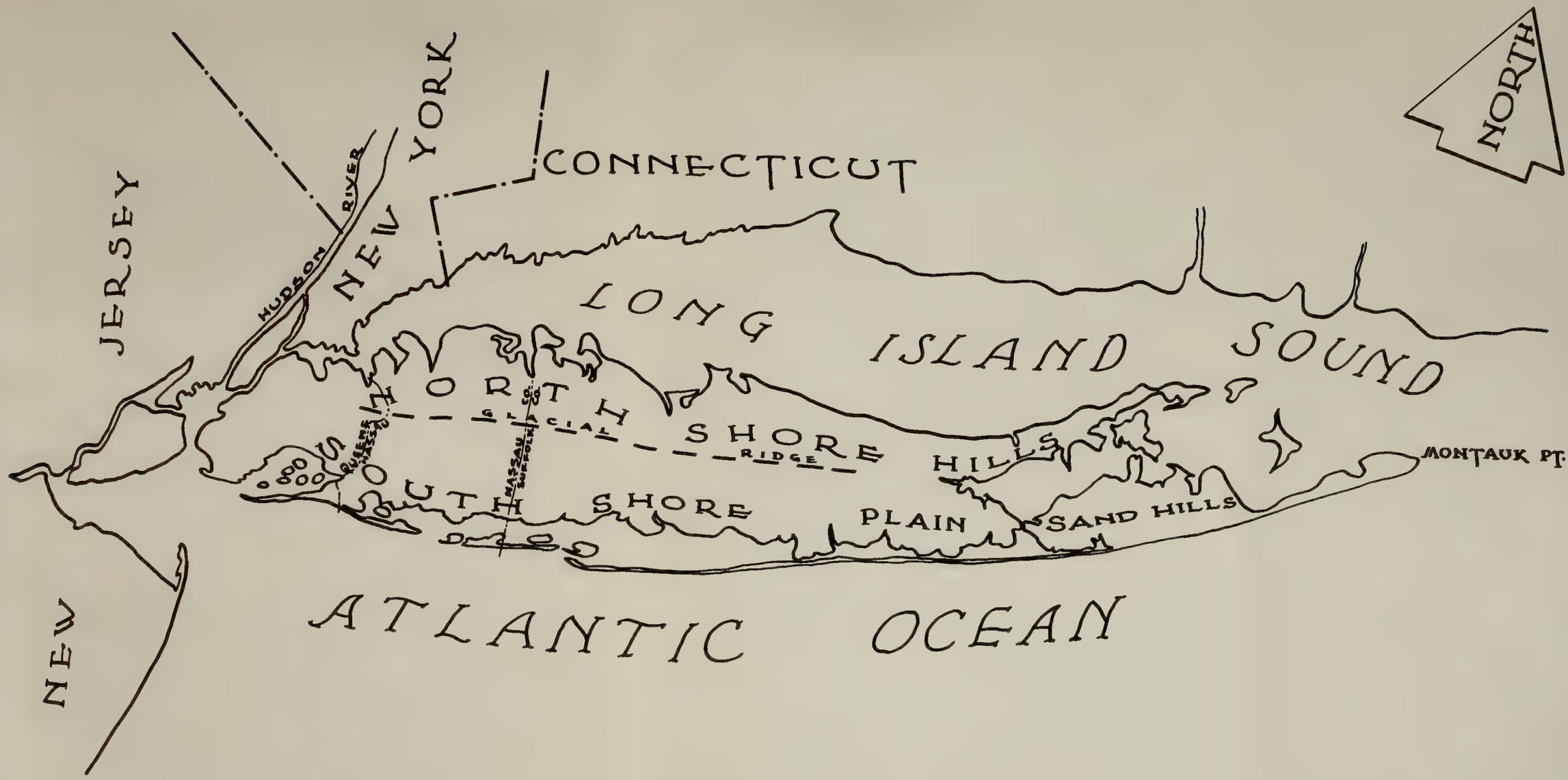
wide or special district basis.

The cities and villages elect their own officials, headed by a Mayor and a Board of four or six Trustees and such others as may be designated. The cities are outside the jurisdiction of the townships, and the villages, which are within the geographic boundaries of the townships, rely on them for only certain services. The Village Boards legislate, license, zone, issue building permits, and, in some cases, maintain highway and police departments.

The recent vesting of the zoning authority in the Town Boards removed one of the original reasons for the incorporated villages; however, existing villages retain that power, but no additional village police departments may be created.

The fifty-nine school districts located in the county are subject only to state supervision. All school affairs, including the election of members of the Board of Education and the setting of budgets and tax rates, are the responsibility of the electorate of each individual district. The town sends out the school tax bills and collects them as a service to the school districts and guarantees payment of all uncollected taxes, but neither the town nor the county has any control over school district budgets or tax rates.

Within the county there are some 260 special improvement districts, which are administered by locally-elected Commissioners or the Town Board. These are set up by public petition or by motion of the Town Board in certain areas to provide such services as sewers, garbage and ash removal, parks and parking, fire, water, etc. Only those residents sharing in the particular improvement bear the financial burden of its support.



PREDOMINANT
GEOGRAPHICAL & TOPOGRAPHICAL
FEATURES
LONG ISLAND — MAY 1956 — NEW YORK

FIGURE 1

FIGURE 2

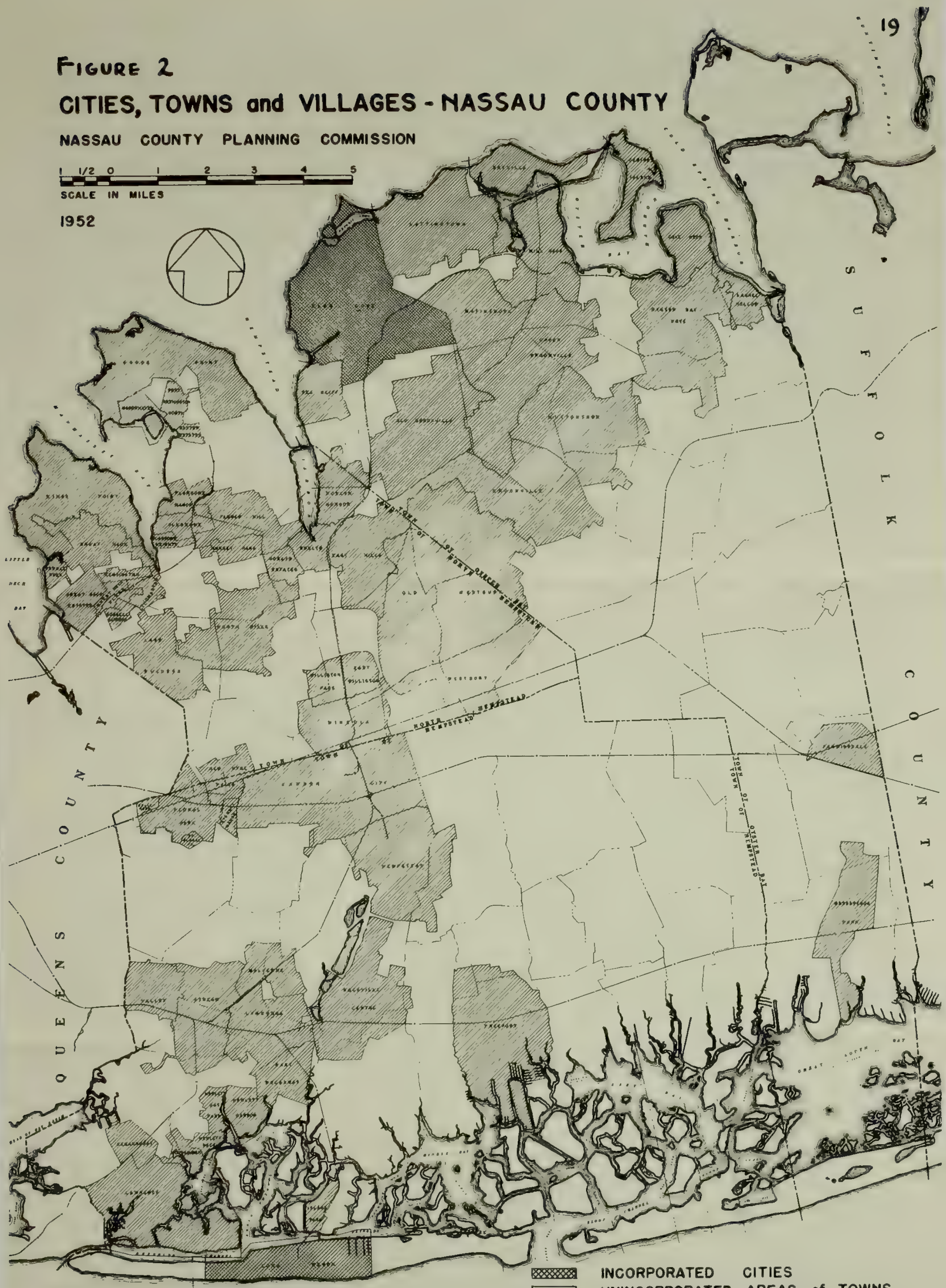
CITIES, TOWNS and VILLAGES - NASSAU COUNTY

NASSAU COUNTY PLANNING COMMISSION

1 1/2 0 1 2 3 4 5

SCALE IN MILES

1952



INCORPORATED CITIES

UNINCORPORATED AREAS of TOWNS

INCORPORATED VILLAGES

NOTE: BASIC INFORMATION OBTAINED FROM RECORDS SUPPLIED BY MUNICIPAL OFFICIALS

Long Island State Park Commissioner Robert Moses has publicly declared that; "Compared to other similar communities bordering on great cities, Nassau County's expansion has reflected exceptional leadership, intelligent direction, cooperation with city and state governments and an ingenious integration of townships, villages, and cities with an effective central county government. Central authority and local autonomy have to an exceptional degree been balanced and maintained."

POPULATION

Nassau County's proximity to the urban concentration of New York City and the increasing tendency of the city dweller to seek a spot in the suburbs, a nation-wide trend, has led to a phenomenal population growth for this area in the past fifteen years. This growth is readily shown by a look at the census figures for Nassau County from 1900 to 1950 and the estimate for 1956.

Census Figures for Nassau County		Long Island Lighting Company Estimate for January, 1956:
1900	55,448	
1910	83,930	
1920	126,120	
1930	303,053	1,087,118
1940	406,748	
1950	672,765	

The acceleration of growth indicated in the period 1940-1950 was such that Nassau County led the New York metropolitan region, New York State, and the rest of the nation in growth. During this period, its population growth rate exceeded that of the larger counties throughout the nation, until today it is larger than 14 of the 48 states in the nation.

The New York Regional Plan Association estimates that by 1960 the

population of Nassau County will have climbed to 1,250,000, and the Long Island Lighting Company estimate for 1960 is 1,592,000. Even assuming that the average of the two might be optimistic, there will still be an increase of over 200,000 people in the next four years. The NYRPA has published the following figures on the source of the population change within the county:

Natural Increase and Net Migration 1930-1954

Period	Natural Increase	Net Migration
1930-1940	18,700	85,000
1940-1950	55,000	212,000
1950-1954	53,300	240,700

From these figures we can see that the rate of natural increase and net migration has better than doubled for the period since 1950 over the rate during 1940-1950.

The tremendous population growth can be said to fall into two patterns. First there is the expansion, or push, if you will, of the multi-family apartment buildings that are spreading from Queens County over into western Nassau County, as is indicated by the increasing number of building permits issued for these structures in the past two years. However, the greatest part of the development has taken place in the single-family dwelling. The pressure and need for single-family units has brought about such concentrations as Levittown. If one were to compare an aerial photograph of the area taken in 1930 with one taken in 1956, the complete change from a relatively solid agricultural belt to a closely packed concentration of residential subdivisions would be apparent and striking.

The latest population distribution map available is shown in Figure 3.

A comparison of the population distribution with Figure 2 shows that the greater mass and concentration is centered in the unincorporated areas. For the most part this is due to the restrictive zoning and non-availability of land for building in the incorporated areas; it should also be noted that these incorporated areas, especially along the north shore, contain much of what might be termed the most desirable residential land. The majority of the growth and development has taken place, therefore, on the relatively flat plain of the south shore. The effect that topography has had on the above situation can best be seen by comparing Figure 3 with Figure 4, a detailed topographical map of Nassau County.

While speculative realtors have predicted for the past several years that the land along the north shore would soon be open for general residential development, information given the writers by reliable public and private officials is to the contrary.

The data in Tables 1 through 5 contain breakdowns of the population in Nassau County with respect to number of households, dwelling units, and distribution by age for the year 1950, as reported by the New York State Department of Commerce.[1] The tables for communities with from

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[1]The urban population shown includes all persons living in incorporated or unincorporated communities of over 2,500 persons, or in the densely settled urban fringe of the cities. The remaining population is divided into rural farm and rural non-farm. In each community, half the adults completed more, half completed less, than the figure given for median school years completed. The column giving the percentage completing at least four years of high school combines those with exactly four years, those with some college, and those with four years of college.

The figures for households are based on a household that includes both related and unrelated persons (such as lodgers) occupying a dwelling unit. Population in the households does not include inmates of institutions, such as homes for aged persons or delinquent children, prisons, or hospitals, which are shown separately, nor does it include residents of a quasi-household, such as large lodginghouses, hotels, labor camps, or military barracks.

FIGURE 3

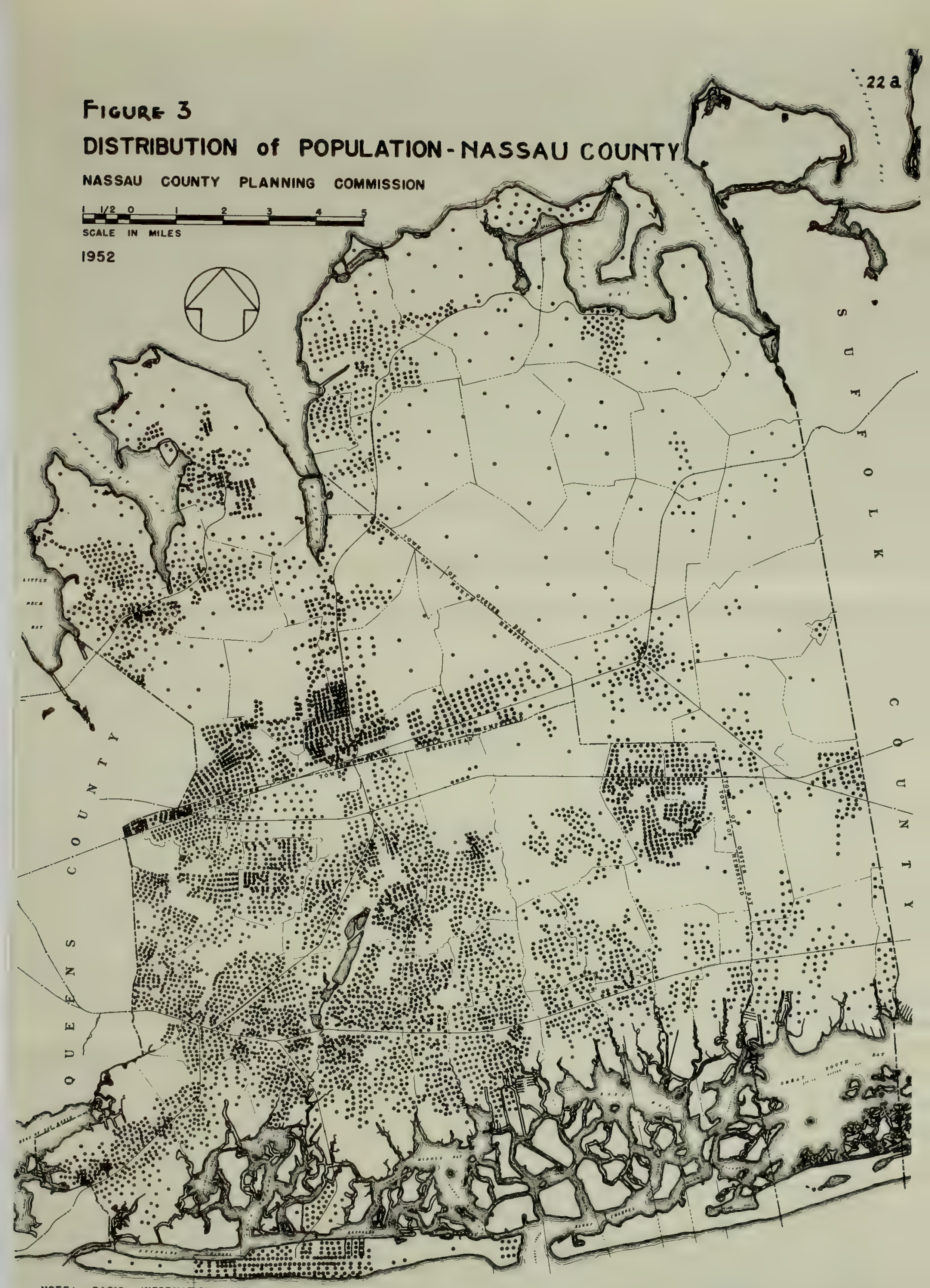
DISTRIBUTION of POPULATION - NASSAU COUNTY

NASSAU COUNTY PLANNING COMMISSION

1 1/2 0 1 2 3 4 5

SCALE IN MILES

1952



NOTE: BASIC INFORMATION OBTAINED FROM 17 TH U.S. CENSUS – 1950

EACH DOT REPRESENTS 100 PERSONS

FIGURE 4

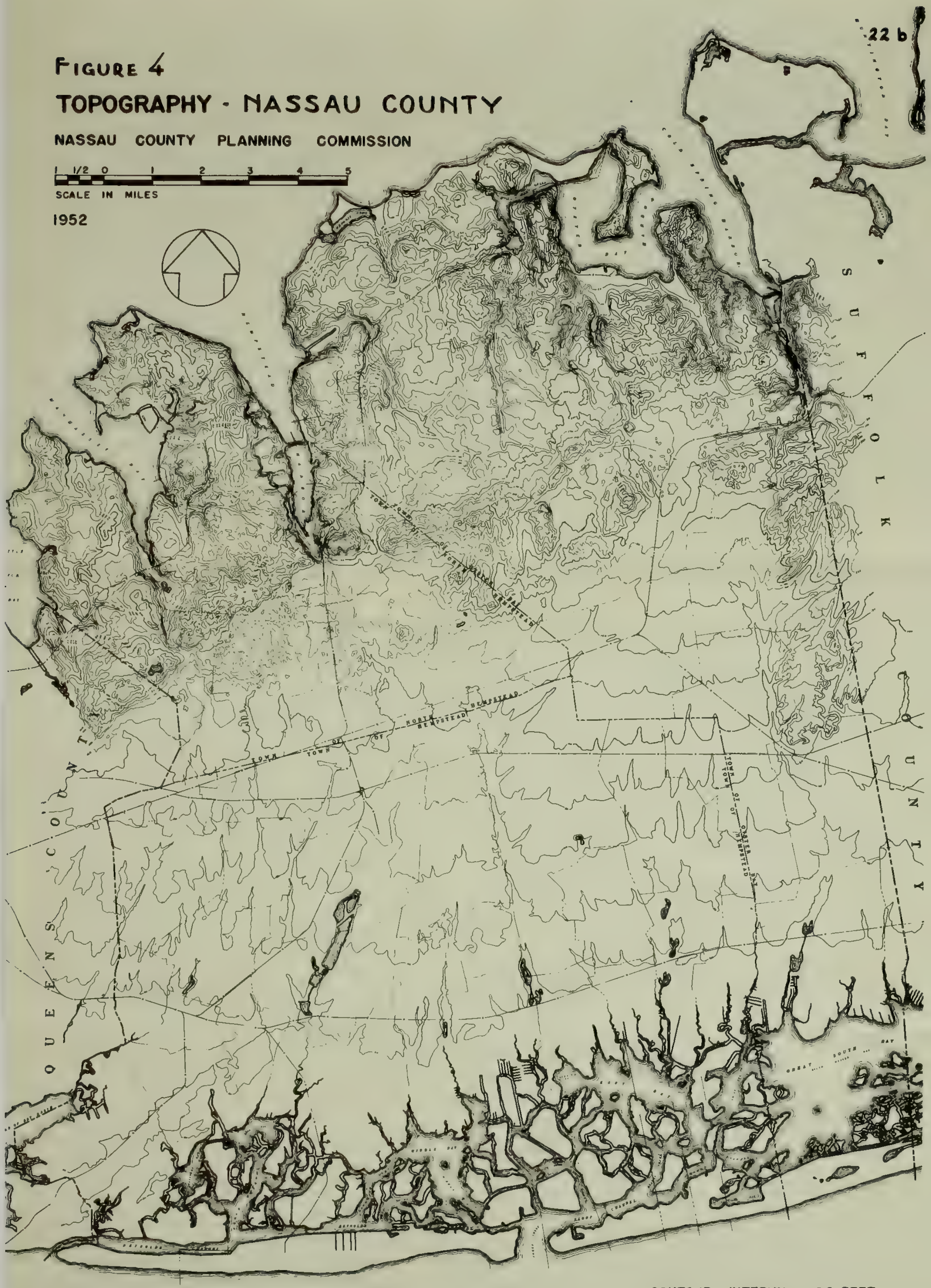
TOPOGRAPHY - NASSAU COUNTY

NASSAU COUNTY PLANNING COMMISSION

1 1/2 0 1 2 3 4 5

SCALE IN MILES

1952



NOTE: BASIC INFORMATION OBTAINED FROM U.S. GEOLOGICAL SURVEY & U.S. ARMY CORPS OF ENGINEERS; ALSO FROM NASSAU COUNTY DEPT. OF PUBLIC WORKS

CONTOUR INTERVAL— 20 FEET

1,000 to 2,500 population include data from unpublished census information.

Comparing the data shown, one finds that the largest percentages of home-owners occupying the dwellings occur in the areas with the highest percentages of homes with private bath and toilet and high valuation figures. These areas are confined for the most part to the incorporated villages of the north shore.

The 1950 census data include, as residents of the community, students, salesmen, construction workers, and other persons who spend a major part of the year away from home; previous years did not. The lines defining the census tracts were changed to such a degree that comparison of the 1950 figures with previous years would show little.

Analysis of these tables gives the following comparison for the people of Nassau as compared with the State of New York: Nassau County people average 31.3 years of age, have 3.51 persons per family, and have completed 12.1 years of school; the New York State averages are 33.7 years of age, 3.27 persons per family, and 9.6 years of school completed. Nassau County leads all other counties in the state in youthfulness and average years of schooling completed.

While the tables are based on data for 1950, reliable estimates for later years do not change the relative percentages except in the case of home ownership. There is an increasing trend toward individual ownership. With this trend in higher percentages of home ownership, especially true of the young-married-couple group purchasing three-bedroom dwelling units, and the rises in school registrations, it has been estimated that the characteristics of the population will prevail through 1960.

In order to present the picture of population growth and distri-

TABLE 1

NASSAU COUNTY POPULATION DISTRIBUTION, BY COMMUNITIES OF OVER 2500, FOR YEAR 1950

County and Community	Number of Persons	Population in 1950				
						Persons 25 years and Over
	1950	Urban	Rural Nonfarm	Rural Farm	Percent Female	Median School Years Completed
New York State	14,830,192	12,682,446	1,570,092	577,854	51.2	9.6
Nassau-Suffolk District	946,894	745,985	191,474	11,435	50.8	11.6
Nassau County	672,765	624,102	46,916	1,747	51.0	12.1
Cedarhurst	6,051	6,051	.....	.....	52.3	11.9
East Hills	2,547	2,547	.....	.....	48.9	15.0
East Rockaway	7,970	7,970	.....	.....	52.9	12.2
Farmingdale	4,492	4,492	.....	.....	49.2	10.4
Floral Park	14,582	14,582	.....	.....	52.2	11.6
Freeport	24,680	24,680	.....	.....	52.1	11.8
Garden City	14,486	14,486	.....	.....	54.0	12.8
Glen Cove	15,130	15,130	.....	.....	51.2	9.9
Great Neck	7,759	7,759	.....	.....	53.2	12.3
Great Neck Plaza	4,246	4,246	.....	.....	55.0	12.9
Hempstead	29,135	29,135	.....	.....	52.1	12.0
Lawrence	4,681	4,681	.....	.....	54.0	12.3
Long Beach	15,586	15,586	.....	.....	51.2	12.2
Lynbrook	17,314	17,314	.....	.....	51.9	12.0
Malverne	8,086	8,086	.....	.....	51.3	12.3
Mineola	14,831	14,831	.....	.....	50.9	11.2
New Hyde Park	7,349	7,349	.....	.....	50.5	10.3
Oyster Bay	5,215	3,215	.....	.....	50.0	9.6
Rockville Centre	22,362	22,362	.....	.....	53.7	12.4
Sea Cliff	4,868	4,868	.....	.....	51.8	12.3
Valley Stream	26,854	26,854	.....	.....	50.9	10.8
Westbury	7,112	7,112	.....	.....	50.2	12.1
Williston Park	7,505	7,505	.....	.....	51.1	11.1

Source: U. S. Census, 1950.

TABLE 2

NASSAU COUNTY POPULATION DISTRIBUTION BY HOUSEHOLDS
COMMUNITIES OVER 2500 FOR THE YEAR 1950

County and Community Population 2500 and Over	Number	Population in Households	Population per Household	Inmates of Institutions
Nassau County	188,666	662,090	3.51	1,466
Cederhurst	-	-	-	-
East Hills	-	-	-	-
East Rockaway	-	-	-	-
Farmingdale	--	-	-	-
Floral Park	4,410	14,541	3.30	0
Freeport	7,137	24,290	3.40	0
Garden City	4,098	13,972	3.41	129
Glen Cove	4,030	14,704	3.65	80
Great Neck	-	-	-	-
Great Neck Plaza	-	-	-	-
Hempstead	8,433	28,277	3.35	21
Lawrence	-	-	-	-
Long Beach	4,793	15,467	3.23	0
Lynbrook	5,072	17,228	3.40	0
Malverne	-	-	-	-
Mineola	4,156	14,664	3.53	0
New Hyde Park	-	-	-	-
Oyster Bay	-	-	-	-
Rockville Centre	6,326	21,942	3.47	38
Sea Cliff	-	-	-	-
Valley Stream	7,772	26,812	3.45	16
Westbury	-	-	-	-
Williston Park	-	-	-	-

Where no figure is given, none is available.

Source: U. S. Census, 1950.

TABLE 3

NASSAU COUNTY DISTRIBUTION OF POPULATION BY AGE,
COMMUNITIES OVER 2500 FOR YEAR 1950

County and Community	Median Age	Percentage of Total Population						
		Under Years	5-14 Years	15-24 Years	25-44 Years	45-54 Years	55-64 Years	65 Years and Over
Nassau County	31.3	12.0	15.0	11.8	34.3	12.7	8.1	6.0
Cedarhurst	33.5	8.7	15.7	13.8	31.3	14.6	9.0	6.9
East Hills	29.9	15.4	16.2	11.4	39.3	9.3	5.1	3.4
East Rockaway	33.1	10.8	15.4	11.9	30.6	14.2	9.1	8.1
Farmingdale	32.9	8.5	14.2	14.4	32.5	13.4	9.3	7.7
Floral Park	38.4	7.0	13.1	13.1	27.3	18.0	12.7	8.8
Freeport	35.2	9.0	14.6	12.6	30.0	14.0	10.4	9.4
Garden City	38.6	6.9	15.7	12.1	26.9	18.8	11.5	8.1
Glen Cove	30.7	10.9	14.3	14.6	32.3	11.4	9.1	7.5
Great Neck	34.5	9.5	16.9	10.3	33.5	14.5	19.2	6.0
Great Neck Plaza	37.7	7.7	9.3	10.6	36.0	17.2	11.8	7.4
Hempstead	33.6	9.8	13.2	12.3	33.9	14.0	9.6	7.2
Lawrence	35.4	7.0	15.8	15.3	29.8	18.4	8.5	5.4
Long Beach	33.3	10.0	14.1	12.9	32.3	15.2	9.2	6.3
Lynbrook	35.9	8.8	13.9	11.8	30.2	15.3	11.2	8.8
Malverne	35.3	8.9	18.4	11.3	30.7	17.5	7.7	5.6
Mineola	31.7	11.1	14.5	12.6	33.8	12.9	8.9	6.2
New Hyde Park	31.4	10.5	16.4	12.2	35.1	12.4	8.2	5.3
Oyster Bay	31.4	9.2	15.2	14.9	30.8	12.1	10.0	7.9
Rockville Centre	37.2	7.6	15.3	12.1	28.8	16.9	10.5	8.8
Sea Cliff	33.2	10.9	15.8	11.3	30.2	12.6	9.9	9.3
Valley Stream	32.7	11.1	14.7	11.7	33.0	14.6	8.9	6.0
Westbury	29.6	13.7	15.4	12.9	35.8	10.5	7.1	4.8
Williston Park	32.3	11.0	15.0	12.8	31.0	16.2	8.8	5.2

County and Communities of 2500 Population and Over.

Source: U. S. Census, 1950.

TABLE 4

NASSAU COUNTY DISTRIBUTION OF DWELLING UNITS, COMMUNITIES OF 1,000-2500 BY; PERCENTAGE OWNER OCCUPIED, CONDITION, AVERAGE MONTHLY RENT AND VALUE
Un. = Unincorporated Village V.= Incorporated Village

Community	Number	Owner Occupied as % of all occ.	% with Private Bath and Toilet, Not dilapidated	Average Contract Monthly Rent	Average Value Owner Occupied One Family Structure
Bayville V.	1,261	70.8	89.3	$60.63	$12,943
Bellrose V.	368	91.2	95.3	-	18,024
East Williston V.	490	95.3	99.4	-	21,267
Flower Hill V.	471	98.7	99.6	-	9,538
Great Neck Estates V.	684	86.9	99.8	-	14,658
Island Park V.	825	69.2	91.5	55.24	9,208
Kings Point V.	369	76.3	99.2	-	8,601
Lake Success V.	366	93.9	100.0	-	30,273
Manorhaven V.	650	68.8	96.0	70.29	10,056
Massapequa Park V.	757	90.1	99.3	-	10.830
Munsey Park V.	557	97.8	100.0	-	8,663
Old Westbury V.	321	40.7	96.4	-	-
Plandome V.	321	94.4	99.6	-	29,623
Roslyn V.	500	35.1	93.9	76.41	15,261
Stewart Manor V.	549	94.8	100.0	-	12,711
Syosset Un.	343	77.9	87.7	-	13,518
Thomaston V.	626	57.4	98.8	66.23	21.708
THE TOWNS OF NASSAU COUNTY					
Hempstead	130,391	76.3	96.3	59.06	13,198
North Hempstead	41,229	77.7	96.8	73.60	16,994
Oyster Bay	21,775	74.4	94.9	51.62	12,648

Where no figure is given, none is available.

Source: U. S. Census, 1950.

TABLE 5

NASSAU COUNTY DISTRIBUTION OF POPULATION BY AGE
TOWNS AND COMMUNITIES 1,000-2500, 1950
Un.= Unincorporated Village V.= Incorporated Village

Community	Total	Percentage of the Total Population				
		Under 15 Years	15-24 Years	25-54 Years	55-64 Years	65 Years and Over
Bayville V.	1,981	25.5	10.8	44.6	10.8	8.3
Bellrose V.	1,134	14.7	13.9	45.6	15.3	10.5
East Williston V.	1,734	25.3	11.4	46.9	10.0	6.3
Flower Hill V.	1,948	34.2	8.3	45.5	7.6	4.3
Great Neck Estates V.	2,464	24.1	11.2	49.1	9.5	6.1
Island Park V.	2,031	25.0	12.9	45.3	8.6	8.2
Kings Point V.	2,445	14.7	45.0	31.1	6.2	2.9
Lake Success V.	1,264	28.3	7.8	53.1	6.7	4.1
Manorhaven V.	1,819	29.7	13.0	47.9	6.7	2.7
Massapequa Park V.	2,334	37.7	7.2	49.1	4.0	2.1
Munsey Park V.	2,048	27.7	10.9	46.6	8.7	6.0
Old Westbury V.	1,160	22.7	9.7	49.4	11.7	6.6
Plandome V.	1,102	25.7	11.2	46.3	9.4	7.4
Roslyn V.	1,612	24.9	10.0	50.1	7.6	7.4
Stewart Manor V.	1,879	23.7	11.3	49.1	9.6	6.2
Syosset Un.	1,133	24.7	11.3	47.0	10.0	7.1
Thomaston V.	2,045	22.3	10.6	49.4	10.9	6.8
THE TOWNS OF NASSAU COUNTY						
Hempstead	432,506	27.1	11.8	47.0	8.0	6.0
North Hempstead	142,613	27.1	11.5	48.0	8.0	5.4
Oyster Bay	66,930	27.6	11.7	45.7	8.5	6.5

Source: U. S. Census, 1950.

bution for the period from 1950 through 1956, the data from the report of the Long Island Lighting Company, as contained in their Population Survey 1956 Nassau and Suffolk, is included in this study. The method used in computing the data for the Long Island Lighting Company report has been tested by independent survey and found to be extremely accurate.[2] For this reason, the data in the company's report is generally accepted as being the best available.

The continuing data upon which these population estimates are based show that the growth trend established in the early postwar period still continues. The trend, however, is perceptibly shifting eastward. While Nassau County has experienced the larger numerical growth, Suffolk County has had a greater percent of increase. Since the census of 1950, the population of Nassau County has increased by 61.8 percent and that of Suffolk County by 63.7 percent. The estimated population figures are derived from the active residential electric meter count and population factors. Active residential electric meters are the equivalent of occupied dwelling units.

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[2]The key and critical figures in this method of estimating are the population factors. These factors are meter ratios, produced by correlation of the active meters and the population figures, district by district, at the time of the census. The population factors, though carefully computed at the time of the census, are not stable figures. These factors are affected by the natural rate of increase and by net migration changes in any district. The possible deviation from the predetermined factor varies from area to area and is dependent largely on the age and growth potentials of a community.

The factors used in these interim census estimates are adjusted to reflect these changes. The population factros are checked against available vital statistics and school census figures. These checks are supplemented by field surveys conducted each summer. Adjustment of the population factors is particularly important in the new growth areas where statistics change rapidly. In the older, well-established districts, tests show that the factor remains nearly stable.

An independent test of the method of using residential electric meters

The number and location of the meters is known and forms a firm base for estimating the degree of change in specific areas.

The Index map, Figure 5. describes the district areas for which the detailed figures are given in Tables 6 through 34; the population curves for both Nassau and Suffolk Counties are shown in Figure 6. Nassau County and the towns of Huntington and Babylon in Suffolk County are tabulated in detail. Each district tabulation is numbered to correspond with the area as shown on the Index map.

The district boundaries of incorporated communities follow, in a general way, the natural divisions of the terrain such as brooks and creeks, or the conventional boundaries of the parkways, or they may lie in the sparser area between adjacent communities. The boundaries of the unincorporated areas, though arbitrary, are firm. These boundaries may or may not coincide with any other arbitrary boundaries, such as school, fire, postal, or water districts. The districts as defined are treated in their entirety and are not subject to subdivision or rearrangement to fit other arbitrary limits.

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as an index to current population was made by Hofstra College Research Bureau in November of 1952. The Bureau's "Summary of Findings" indicated that electric meters provide a highly satisfactory index to population in Nassau and Suffolk Counties. In the test of correlation between census and meter data for the two counties in 1940 and 1950, it was found that the relationship between the two sets of data was exceedingly close. In testing for the predictive accuracy of the meter data, using the 1940-1950 period, for which the census data were available, the Bureau found that the 1950 population was predicted with notable accuracy. With the adjustment of the population factors in relation to the measured changes in the various districts, it is expected that the margin of error is considerably reduced. None of the several methods of calculation yielded an error greater than five percent, one method yielding no error at all. The population figures shown are the actual census figures for 1950 and estimates for the first of January for the years 1952, 1954, and 1956.

The balance of the towns in Suffolk County are not treated in the same detail. The figures shown for these areas are for the individual incorporated villages and the balance of the town for each township.

Population data for Nassau and Suffolk Counties are presented together, rather than separately, in order that they may be more easily used for comparative purposes.

HUDSON RIVER
MANHATTAN
N.Y.C.
BROOKLYN
QUEENS CO.
NASSAU CO.
HEMPSTEAD HARBOR
OYSTER BAY
HUNTINGTON BAY
SUFFOLK CO.
SMITHTOWN BAY
BETHPAGE
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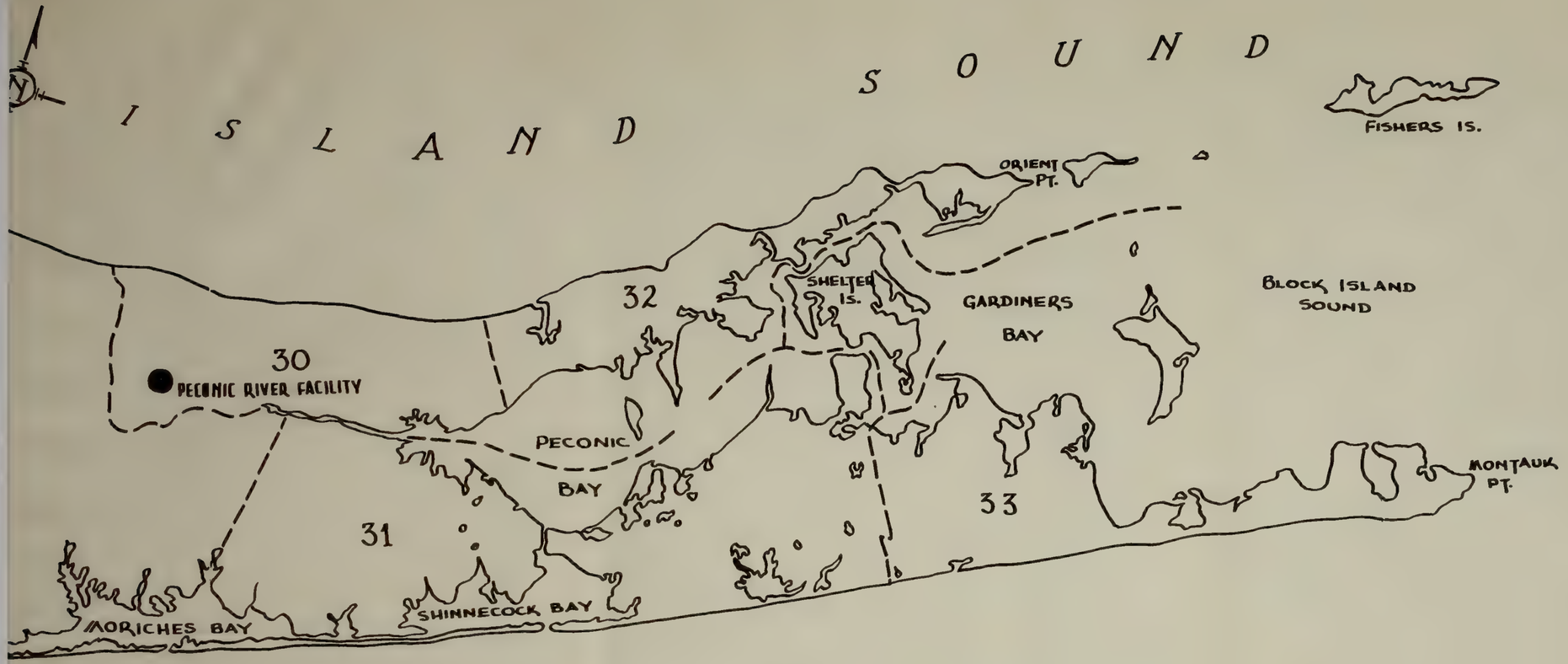
GREAT SOUTH BAY
L O N G
A T L A N T I C

FIGURE 5



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0 2 4 6 8 10
SCALE - MILES

DISTRICT AREAS POPULATION SURVEY 1956 LONG ISLAND LIGHTING COMPANY LONG ISLAND, NEW YORK

DISTRICT AREA INDEX

LONG ISLAND LIGHTING COMPANY POPULATION SURVEY

NASSAU COUNTY

TOWN OF NORTH HEMPSTEAD

1. Great Neck Area
2. Port Washington - Manhasset Area
3. Roslyn Area
4. New Hyde Park - Mineola Area
5. Westbury Area

TOWN OF HEMPSTEAD

6. Floral Park - Franklin Square Area
7. Garden City - Hempstead Area
8. East Meadow - Levittown Area
9. Valley Stream - Lynbrook Area
10. Rockville Centre - Freeport Area
11. Merrick - Seaford Area
12. The Branch Area
13. Long Beach Area

TOWN OF OYSTER BAY

14. Glen Cove Area
15. Oyster Bay Area
16. Brookville Area
17. Syosset - Plainview Area
18. Hicksville - Jericho Area
19. Farmingdale - Bethpage Area
20. Massapequa Area

SUFFOLK COUNTY

TOWN OF HUNTINGTON

21. Huntington Area
22. Northport Area
23. South Huntington Area

TOWN OF BABYLON

24. North Babylon Area
25. Amityville - Lindenhurst Area
26. Babylon Area

27. TOWN OF SMITHTOWN
28. TOWN OF ISLIP
29. TOWN OF BROOKHAVEN
30. TOWN OF RIVERHEAD
31. TOWN OF SOUTHAMPTON
32. TOWN OF SOUTHOLD
33. TOWN OF EAST HAMPTON
34. TOWN OF SHELTER ISLAND

TABLE 6

Population Summary Table

NASSAU AND SUFFOLK COUNTIES BY TOWNSHIPS

	1950 Census	Estimate Jan. 1, 1952	Estimate Jan. 1, 1954	Estimate Jan. 1, 1956
NASSAU COUNTY				
North Hempstead	142,613	166,110	184,060	195,711
Hempstead	448,092	545,039	618,065	665,948
Oyster Bay	82,060	119,486	164,716	225,459
Total County	672,765	830,635	966,841	1,087,118
SUFFOLK COUNTY				
Babylon	45,556	61,743	75,972	88,527
Huntington	47,506	55,054	66,985	83,701
Islip	71,465	80,825	96,543	119,340
Smithtown	20,993	22,546	24,575	28,381
Brookhaven	44,522	50,687	58,721	67,644
Riverhead	9,973	11,280	12,387	13,736
Southampton	17,013	19,245	20,217	23,955
Southold	11,632	12,564	13,861	15,308
East Hampton	6,325	7,096	9,112	10,261
Shelter Island	1,144	1,172	1,200	1,230
Total County	276,129	322,212	379,573	452,083
Total Both Counties	948,894	1,152,847	1,346,414	1,539,201
Fifth Ward of Queens	51,103	52,807	55,708	60,693

Source: Tables 6-34, LILCO Population Survey - 1956

TABLE 7

NASSAU COUNTY

POPULATION
Great Neck Area - District 1
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Kings Point	2,445	3,062	3,742	4,365
Great Neck	7,759	9,064	9,654	9,858
Saddle Rock	33	695	734	878
Kensington	978	1,038	1,079	1,058
Great Neck Estates	2,464	2,672	2,809	2,929
Great Neck Plaza	4,246	4,510	4,706	4,634
Thomaston	2,045	2,261	2,425	2,586
Russell Gardens	912	993	1,036	1,046
Lake Success	1,264	1,764	2,258	2,343
Total	22,146	26,059	28,443	29,697
Unincorporated Places				
1,2, & 3 Great Neck - Unincorporated	6,704	8,946	9,350	9,832
Total Area	28,850	35,005	37,793	39,529

TABLE 8

POPULATION

Port Washington-Manhasset Area - District 2
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan.1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Sands Point	860	1,051	1,220	1,504
Manor Haven	1,819	2,077	2,345	2,667
Port Washington North	650	636	650	650
Baxter Estates	862	869	934	948
Plandome Manor	323	349	437	511
Plandome	1,102	1,145	1,188	1,213
Plandome Heights	579	587	598	624
Flower Hill	1,948	2,570	3,056	4,290
Munsey Park	2,048	2,105	2,198	2,516
Total	10,191	11,389	12,626	14,923
Unincorporated Places				
1. Port Washington	12,735	14,569	15,882	16,877
2. Manhasset	7,864	8,197	8,218	8,272
Total	20,599	22,766	24,100	25,149
Total Area	30,790	34,155	36,726	40,072

TABLE 9

POPULATION

Roslyn Albertson Area - District 3
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Roslyn	1,612	2,152	2,383	2,617
Roslyn Harbor (a)	402	553	553	568
Roslyn Estates	612	798	895	1,048
East Hills	2,547	4,255	4,542	5,031
North Hills	330	316	337	320
Total	5,503	8,074	8,710	9,584
Unincorporated Places				
1. Roslyn Heights	2,871	3,617	3,838	4,196
2. Greenvale (a)	1,184	1,284	1,626	1,644
3. Albertson	4,729	5,626	7,482	7,680
Total	8,784	10,527	12,946	13,520
Total Area	14,287	18,601	21,656	23,104

(a) Part in Town of Oyster Bay

TABLE 10

POPULATION

New Hyde Park-Mineola Area - District 4
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
New Hyde Park (a)	7,349	9,126	9,898	10,142
Mineola	14,831	17,640	19,255	19,255
Williston Park	7,505	7,633	7,792	7,541
East Williston	1,734	1,937	2,375	2,643
Total	31,419	36,336	39,320	39,581
Unincorporated Places				
1. North New Hyde Park	14,750	16,637	17,263	17,399
2. Garden City Park	7,744	8,738	11,358	12,544
Total	22,494	25,375	28,621	29,943
Total Area	53,913	61,711	67,941	69,524

(a) Part in Town of Hempstead

TABLE 11

POPULATION

Westbury Area - District 5
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Westbury	7,112	8,774	11,156	13,200
Old Westbury (a)	1,160	1,179	1,261	1,718
Total	8,272	9,953	12,417	14,918
Unincorporated Places				
1. Carle Place	3,951	4,370	4,719	4,960
2. New Cassel	3,179	3,844	4,521	5,572
Total	7,130	8,214	9,240	10,532
Total Area	15,402	18,167	21,657	25,450

(a) Part in Town of Oyster Bay

TABLE 12

POPULATION

Floral Park-Franklin Square Area - District 6
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Bellerose	1,134	1,146	1,146	1,114
Floral Park (a)	14,582	16,402	17,596	18,124
Stewart Manor	1,879	1,942	2,305	2,362
South Floral Park	572	572	673	797
Total	18,167	20,062	21,720	22,397
Unincorporated Places				
1. Bellerose West	2,283	2,264	2,309	2,224
2. Elmont	13,957	18,472	21,491	23,373
3. Franklin Square	19,774	23,032	25,298	26,037
Total	36,014	43,768	49,098	51,634
Total Area	54,181	63,830	70,818	74,031

(a) Part in Town of North Hempstead

TABLE 13

POPULATION

Garden City-Hempstead Area - District 7
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Hempstead	29,135	30,430	32,303	33,270
Garden City	14,486	16,154	18,228	21,792
Total	43,621	46,584	50,531	55,062
Unincorporated Places				
1. West Hempstead-Lakeview	13,958	16,583	18,190	19,396
2. East Hempstead-Uniondale	13,069	15,929	17,430	18,835
Total	27,027	32,512	35,620	38,231
Total Area	70,648	79,096	86,151	93,293

TABLE 14

POPULATION

East Meadow-Levittown Area - District 8
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Unincorporated Places				
1. East Meadow	13,881	32,801	47,303	54,690
2. Levittown	35,884	42,409	52,110	55,572
Total Area	49,765	75,210	99,413	110,262

TABLE 15

POPULATION

Valley Stream-Lynbrook Area - District 9
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Valley Stream	26,854	30,516	32,768	33,910
Malverne	8,086	8,975	9,386	9,625
Lynbrook	17,314	17,734	18,553	19,360
Total	52,254	57,225	60,707	62,895
Unincorporated Places				
1. Valley Stream North & South	17,168	28,203	28,795	31,107
2. Malverne (Unincorporated)	3,411	5,363	6,046	5,138
Total	20,579	33,566	34,841	36,245
Total Area	72,833	90,791	95,548	99,140

TABLE 16

POPULATION

Rockville Centre-Freeport Area - District 10
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Rockville Centre	22,362	24,079	25,176	25,956
Freeport	24,680	26,728	28,359	30,741
Total	47,042	50,807	53,535	56,697
Unincorporated Places				
1. South Hempstead	4,217	6,129	7,560	7,960
2. Roosevelt	8,893	9,380	10,584	12,264
3. Oceanside	14,093	17,909	21,119	23,891
4. Baldwin	19,521	19,880	20,126	20,956
Total	46,724	53,298	59,389	65,071
Total Area	93,766	104,105	112,924	121,768

TABLE 17

POPULATION

Merrick-Seaford Area - District 11
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Unincorporated Places				
1. Merrick-North Merrick	16,041	19,015	21,355	23,109
2. Bellmore-North Bellmore	13,731	17,099	18,768	20,983
3. Wantagh	7,096	16,103	22,680	26,393
4. Seaford	2,879	6,189	9,588	10,813
Total Area	39,747	57,406	72,391	81,298

TABLE 18

POPULATION

The Branch Area - District 12
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
East Rockaway	7,970	8,310	8,933	9,376
Hewlett Bay Park	466	497	519	524
Hewlett Harbor	411	758	920	1,053
Hewlett Neck	369	434	476	484
Woodsburgh	745	863	911	945
Cedarhurst	6,051	6,433	6,544	7,250
Lawrence	4,681	5,304	5,609	5,844
Total	20,693	22,599	23,912	25,476
Unincorporated Places				
1. Hewlett	5,629	6,587	7,103	7,236
2. Woodmere	7,771	9,294	10,328	11,142
3. Inwood	9,842	10,296	10,548	10,899
4. Bay Park	1,688	1,788	1,875	1,964
Total	24,930	27,965	29,854	31,241
Total Area	45,623	50,564	53,766	56,717

TABLE 19

POPULATION

Long Beach Area - District 13
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
City of Long Beach	15,586	16,584	17,999	18,997
Island Park	2,031	2,238	2,318	2,532
Total	17,617	18,822	20,317	21,529
Unincorporated Places				
1. Island Park (Unincorporated)	720	869	1,835	2,244
2. Atlantic Beach	745	864	912	1,057
3. Lido-Point Lookout	1,911	2,288	2,587	3,000
Total	3,376	4,021	5,334	6,301
Total Area	20,993	22,843	25,651	27,830

TABLE 20

POPULATION

Glen Cove Area - District 14
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
City of Glen Cove	15,130	17,130	19,296	21,204
Sea Cliff	4,868	4,998	5,251	5,462
Lattingtown	745	806	886	1,156
Matinecock	507	548	671	769
Total	21,250	23,482	26,104	28,591
Unincorporated Places				
1. Locust Valley	2,790	2,956	3,052	3,230
2. Glenwood Landing (a)	2,185	2,300	2,486	2,744
3. Glen Head	2,519	3,604	4,195	4,430
Total	7,494	8,860	9,733	10,404
Total Area	28,744	32,342	35,837	38,995

(a) Part in Town of North Hempstead

TABLE 21

POPULATION

Oyster Bay Area - District 15
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Bayville	1,981	2,137	2,599	2,596
Mill Neck	505	549	593	647
Centre Island	199	223	253	270
Cove Neck	200	198	212	245
Oyster Bay Cove	561	584	636	707
Laurel Hollow	169	259	248	401
Total	3,615	3,950	4,541	4,866
Unincorporated Places				
1. Oyster Bay	5,314	5,768	5,777	6,203
2. East Norwich	635	768	1,858	1,915
Total	5,949	6,536	7,635	8,118
Total Area	9,564	10,486	12,176	12,984

TABLE 22

POPULATION

Brookville Area - District 16
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Brookville	337	356	439	731
Old Brookville	644	684	794	1113
Upper Brookville	469	524	579	915
Muttontown	382	437	464	545
Total	1,832	2,001	2,276	3,304
Unincorporated Places		Absorbed by Village of Brookville & Greenvale		
1. West Brookville Area	121	277	401	---
Total Area	1,953	2,278	2,677	3,304

TABLE 23

POPULATION

Syosset-Plainview Area - District 17
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Unincorporated Places				
1. Syosset Cold Spring Area	3,217	4,405	5,979	7,804
2. Plainview Area	1,143	3,161	8,205	16,065
Total Area	4,360	7,566	14,184	23,869

Hicksville-Jericho Area - District 18

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Unincorporated Places				
1. Hicksville	12,070	27,502	35,649	40,991
2. Jericho-Locust Grove	448	615	2,953	7,586
Total Area	12,518	28,117	38,602	48,577

TABLE 24

POPULATION

Farmingdale-Bethpage Area - District 19
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Farmingdale	4,492	5,210	5,771	6,177
Unincorporated Places				
1. Bethpage-Plainedge	6,896	12,025	21,565	32,708
2. South Farmingdale	1,991	2,806	4,843	8,528
Total	8,887	14,831	26,408	41,236
Total Area	13,379	20,041	32,179	47,413

TABLE 25

POPULATION

Massapequa Area - District 20
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Massapequa Park	2,334	4,923	8,177	15,118
Unincorporated Places				
1. Massapequa-West Amityville	9,115	13,398	20,574	34,840
Total Area	11,449	18,321	28,751	49,958

TABLE 26

SUFFOLK COUNTY

POPULATION

Huntington Area - District 21
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Lloyd Harbor	945	1,101	1,443	1,767
Huntington Bay	585	661	728	760
Total	1,530	1,762	2,171	2,527
Unincorporated Places				
1. Huntington Area	27,158	32,207	39,910	48,269
Total Area	28,688	33,969	42,081	50,796

TABLE 27

POPULATION

Northport Area - District 22
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Northport	3,859	4,188	4,459	4,602
Asharoken	116	132	145	160
Total	3,975	4,320	4,604	4,762
Unincorporated Places				
Northport Area	12,921	14,598	17,686	24,678
Total Area	16,896	18,918	22,290	29,440

TABLE 28

POPULATION

South Huntington Area - District 23
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Unincorporated Places				
1. South Huntington Area	1,922	2,167	2,614	3,465
Huntington Town Total	47,506	55,054	66,985	83,701

North Babylon Area - District 24

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Unincorporated Places				
1. North Babylon Area	7,554	10,442	12,715	13,106

TABLE 29

POPULATION

Amityville-Lindenhurst Area - District 25
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
Incorporated Places				
Amityville	6,164	6,793	7,114	7,661
Lindenhurst	8,644	10,962	13,853	14,842
Total	14,808	17,755	20,967	22,503
Unincorporated Places				
No. Amityville-Copiague Area	7,847	11,137	13,331	15,655
Total Area	22,655	28,892	34,298	38,158

TABLE 30

POPULATION

Babylon Area - District 26
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1. 1954 Estimate	Jan. 1. 1956 Estimate
Incorporated Places				
Babylon	6,015	7,193	7,816	8,793
Unincorporated Places				
1. South Babylon Area	9,332	15,216	21,143	28,470
Total Area	15,347	22,409	28,959	37,263
Babylon Town Total	45,556	61,743	75,972	88,527

TABLE 31

POPULATION

Towns of Smithtown and Islip
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
TOWN OF SMITHTOWN-DISTRICT 27				
Incorporated Places				
Village of the Branch	163	157	163	448
Head of the Harbor	334	350	394	412
Nissequogue	219	219	271	324
Total	716	726	828	1,184
Unincorporated Area	20,277	21,820	23,747	27,197
Total District	20,993	22,546	24,575	28,381
TOWN OF ISLIP-DISTRICT 28				
Incorporated Places				
Brightwaters	2,336	2,458	2,704	2,852
Ocean Beach	73	73	75	70
Saltaire	21	21	30	30
Total	2,430	2,552	2,809	2,952
Unincorporated Area	69,035	78,273	93,734	116,388
Total District	71,465	80,825	96,543	119,340

TABLE 32

POPULATION

Towns of Brookhaven and Riverhead
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
TOWN OF BROOKHAVEN-DISTRICT 29				
Incorporated Places				
Oldfield	238	246	256	297
Belle Terre	120	132	132	144
Poquott	136	145	178	192
Shoreham	90	104	107	118
Patchogue	7,361	8,317	8,786	9,119
Bellport	1,449	1,638	1,726	1,943
Total	9,394	10,582	11,185	11,813
Unincorporated Area	35,128	40,105	47,536	55,831
Total District	44,522	50,687	58,721	67,644
TOWN OF RIVERHEAD-DISTRICT 30				
Total District (Unincorporated)	9,973	11,280	12,387	13,736

TABLE 33

POPULATION

Towns of Southampton and Southold
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
TOWN OF SOUTHAMPTON-DISTRICT 31				
Incorporated Places				
North Haven	153	218	259	357
Sag Harbor (a)	2,373	2,580	2,703	2,832
Southampton	4,042	4,239	4,524	4,730
Quogue	625	686	708	722
Westhampton Beach	1,087	1,234	1,532	1,704
Total	8,280	8,957	9,726	10,345
Unincorporated Area	9,651	11,284	11,553	14,750
Total District	17,931	20,241	21,279	25,095
TOWN OF SOUTHOLD-DISTRICT 32				
Incorporated Places				
Greenport	3,028	3,050	3,141	3,466
Unincorporated Area	8,604	9,514	10,720	11,842
Total District	11,632	12,564	13,861	15,308

(a) Part in Town of East Hampton

TABLE 34

POPULATION

Towns of East Hampton and Shelter Island
Years: 1950, 1952, 1954, 1956

	Population			
	1950 Census	Jan. 1, 1952 Estimate	Jan. 1, 1954 Estimate	Jan. 1, 1956 Estimate
TOWN OF EAST HAMPTON-DISTRICT 33				
Incorporated Places				
East Hampton	1,737	1,884	2,181	2,281
Unincorporated Area	3,670	4,216	5,869	6,840
Total District	5,407	6,100	8,050	9,121
TOWN OF SHELTER ISLAND-DISTRICT 34				
Total District	1,144	1,172	1,200	1,230

LONG ISLAND POPULATION

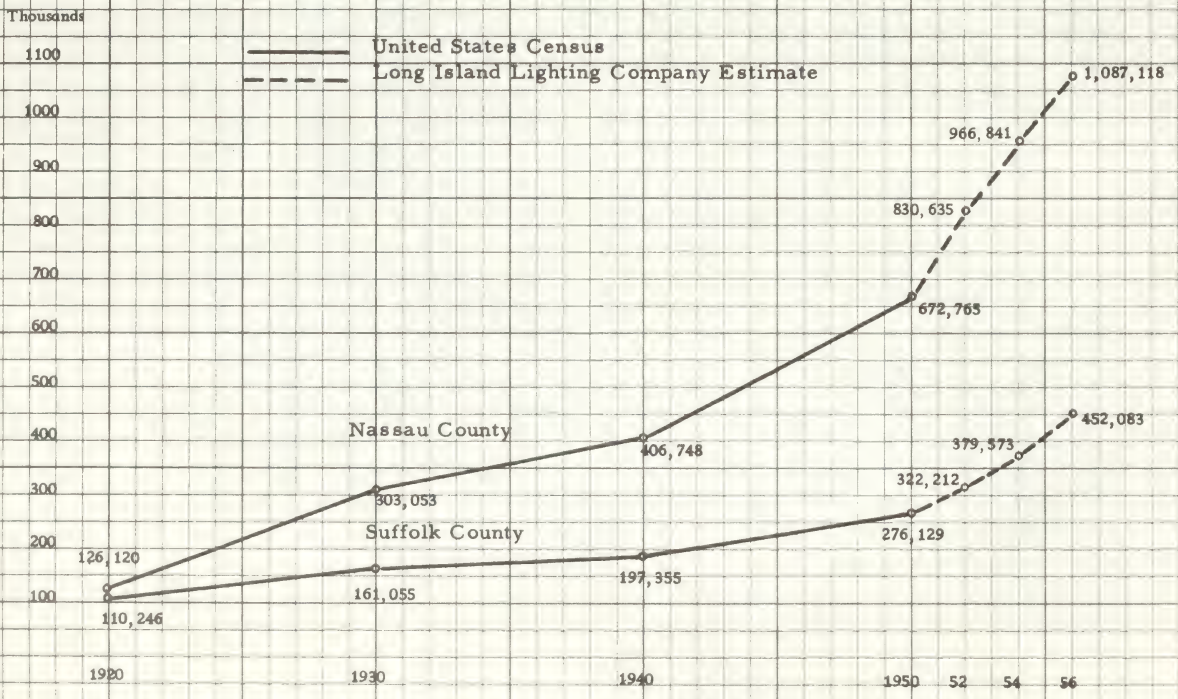

FIGURE 6

SOCIAL AND ECONOMIC CHARACTERISTICS

Industry-Commerce

Long Island became an industrial area long after the other east coast cities and other areas of the state had made their mark as established production centers. The island subsisted primarily as an agricultural area, supplying New York with vegetables and dairy products. The industries of the early days, such as shipbuilding and whaling, had died here as elsewhere along the coast. There remained a collection of small villages, peopled by farmers, and the large estates of landed gentlemen and well-to-do commuters, who preferred the spaciousness of the area.

Aviation as an industry has changed this picture to one of rather heavily-settled urban and suburban areas, supporting a diversified industrial complex headed up by aviation and supporting enterprises; today there are over 121,000 persons in Nassau County and 35,000 in Suffolk County employed in industrial groups.

Industry came to Long Island when the pioneers of the aviation field established companies such as Grumman, Fairchild, and Republic during the 1920's and 1930's, and Sperry in 1941. Many companies producing engines, instruments, and specialized equipment for aircraft mushroomed during World War II. At the peak of the war in 1944 90,000 workers were employed; of these Grumman had 21,000. Republic 25,000, Sperry 32,000, and Fairchild 4,400.

Apart from defense industries there has been a gradual increase in the number of other plants located in Nassau and Suffolk Counties. It is generally estimated that one worker in manufacturing supports 1 to 1.5

persons in retailing, professions, and government and other services; however, on Long Island, it is almost 2. Two factors contribute to this situation: the number of persons who live in the area but are employed in New York City; and those persons who are employed locally, but who live and spend their pay checks outside the area. These figures are borne out by the tables presented in this section.

The data in Tables 35 through 38 are the breakdowns of employment, payrolls, and retail and wholesale trade for the years indicated, as published by the New York State Department of Commerce.[3]

Comparing the data contained in the tables, we see that for the period just prior to 1950 the total manufacturing employment is below that shown for the 1955 total. However, during the period from 1950 to 1955, defense production went through a cycle of increase and is now on the way down. Note that the major portion of the area employment is still concentrated in the defense areas such as aircraft, instruments and ordnance. This situation, coupled with the promised cutbacks in defense spending, are presently causing considerable concern to public officials

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[3]The statistics for employment and payrolls are based on tax reports submitted in compliance with the Old Age and Survivor's Insurance Program. The data for the statewide firms are not included in the county or area totals which are therefore understated.

Employment includes the number of employees covered for the pay period ending nearest March 15, 1948, except those in self-employment and casual employment. Employment of family members, domestics, foreign vessels, government, railroads, certain non-profit organizations, student capacities, ships at sea, and certain fishing vessels are not included.

Payrolls are estimated by multiplying by four the taxable payroll reported for the first quarter of 1948 and may be in error for seasonal employments and for those persons making over three thousand dollars a year, since only the first three thousand is reported for the quarter.

The data for the retail and wholesale trade are based on interpolation of the figures given in the 1940 and 1950 published census counts.

TABLE 35

NASSAU COUNTY DISTRIBUTION OF EMPLOYMENT BY TYPE AS COMPARED WITH TOTAL NASSAU-SUFFOLK AREA
March 1948

Employment	Nassau and Suffolk Total	Nassau	% of Total Type
Manufacturing Total	37,607	31,825	84.6
Ordnance	0		
Food and kindred products	702	323	
Tobacco manufactures	-	0	
Textile mill products	1,608	653	
Apparel and related	3,297	2,220	
Lumber products (except furniture)	514	230	
Furniture and fixtures	495	306	
Paper and allied products	-	134	
Printing and publishing	4,766	4,455	
Chemical and allied	259	147	
Petroleum and coal products	-	-	
Rubber products	0	0	
Leather and related	390	297	
Stone, clay, and glass	881	428	
Primary metals	-	-	
Fabricated metals	2,092*	1,601*	
Machinery (except electric)	1,227	1,060	
Electrical machinery	359	341	
Transportation equipment	12,430*	11,962	
Instruments and related	6,781	6,512	
Miscellaneous manufacture	1,386	1,038	
Retail	23,904	17,997	75.2
Wholesale	6,648	4,495	67.5
Construction	11,796	8,856	75.3
Finance, insurance, real estate	5,468	4,127	75.5
Transportation, communication, public utilities	11,477	9,049	78.7
Service	14,626	9,847	67.2

Where no figure given, none is available.
* Total incomplete, data withheld to avoid disclosure.
Source: New York State Department of Commerce.

TABLE 36

DISTRIBUTION OF ESTABLISHMENTS AND SALES OR RECEIPTS - NASSAU COUNTY AS COMPARED WITH TOTAL NASSAU-SUFFOLK DISTRICT, YEARS SHOWN

Type	Nassau and Suffolk Total	Nassau County Total
Manufacturing 1947		
Establishments	800	517
Total employees	38,938	25,725
Total wages and salaries ($000)	114,594	78,268
Value added manufacturing ($000)	164,267	115,152
Retail 1948		
Establishments	11,295	7,298
Retail sales ($000)	859,786	603,935
Wholesale 1948		
Establishments	589	351
Wholesale sales ($000)	317,133	226,397
Selected Service Trades 1948 Establishments		
Personal services	2,029	1,424
Business services	162	130
Automotive repair, services	476	279
Hotels	157	53
Receipts ($000)		
Personal services	26,896	20,100
Business services	3,644	3,401
Automotive repair, services	8,905	5,668
Hotels	9,266	4,783

Source: New York State Department of Commerce

TABLE 37

NASSAU COUNTY DISTRIBUTION OF EMPLOYED PERSONS FOR COMMUNITIES OVER 2500 - BY TYPE OF EMPLOYMENT AS A PERCENTAGE OF TOTAL FOR YEAR 1950

County and Community	Number Employed	Percentage of Employed Persons				
		Agriculture Forestry & Fisheries	Mining	Construction	Manufacturing	Trans. Comm. Utility
NASSAU	255,721	1.6	0.1	8.7	23.0	10.4
Cedarhurst	2,474	1.1	0.0	8.6	16.4	7.3
East Hills	784	1.4	0.5	4.1	25.4	5.8
East Rockaway	3,184	0.5	0.1	7.3	22.4	9.7
Farmingdale	1,930	1.7	0.1	4.5	38.6	6.6
Floral Park	6,133	0.3	0.1	6.5	23.4	12.2
Freeport	9,576	1.1	0.1	9.4	21.4	10.6
Garden City	5,267	0.2	0.1	3.2	23.0	8.7
Glen Cove	6,060	2.8	0.2	13.7	24.4	8.0
Great Neck	3,165	1.3	0.0	7.4	14.2	6.5
Great Neck Plaza	2,010	0.4	0.1	3.9	14.1	5.7
Hempstead	12,267	0.6	0.1	7.9	18.8	10.1
Lawrence	1,908	1.0	0.0	2.6	29.1	1.6
Long Beach	5,763	0.5	0.1	7.9	17.8	5.2
Lynbrook	6,879	0.8	0.0	7.1	22.1	11.0
Malverne	2,893	0.7	0.1	6.5	22.0	12.3
Mineola	6,167	0.9	0.1	10.2	23.6	12.0
New Hyde Park	3,001	1.4	0.2	10.8	25.2	13.1
Oyster Bay	2,126	5.1	0.4	15.9	18.6	8.2
Rockville Centre	8,843	0.7	0.1	5.1	19.5	7.4
Sea Cliff	1,772	1.7	0.3	10.9	22.8	11.0
Valley Stream	10,471	0.7	0.1	8.7	23.4	14.3
Westbury	2,755	2.5	0.0	11.2	23.6	9.5
Williston Park	3,051	0.4	0.1	8.1	24.4	13.4

Figures given are based on worker's residence.

TABLE 37 Continued

NASSAU COUNTY DISTRIBUTION OF EMPLOYED PERSONS FOR COMMUNITIES OVER 2500 - BY TYPE OF EMPLOYMENT AS A PERCENTAGE OF TOTAL FOR YEAR 1950

County and Community	Percentage of Employed Persons					
	Wholesale Retail Trade	Finance Insurance Real Est.	Business Repair Service	Personal Services	Entertain. and Recreation	Professional Service
NASSAU	21.3	7.6	3.8	7.5	1.7	9.4
Cedarhurst	26.3	5.0	4.5	13.2	2.0	12.0
East Hills	22.3	10.5	3.7	11.0	2.5	11.1
East Rockaway	23.0	10.5	3.7	6.1	1.5	11.0
Farmingdale	18.8	4.3	2.5	5.8	0.9	11.9
Floral Park	20.6	12.1	3.4	3.0	1.5	11.6
Freeport	22.5	7.2	3.8	7.6	1.6	9.9
Garden City	18.3	14.4	4.2	6.8	1.6	16.6
Glen Cove	16.4	3.5	2.7	12.5	1.8	10.2
Great Neck	20.9	5.4	4.0	16.7	1.6	15.0
Great Neck Plaza	20.3	9.0	4.2	7.2	2.6	16.5
Hempstead	24.0	6.0	3.0	9.0	1.7	11.8
Lawrence	18.1	5.1	2.6	28.3	1.1	9.4
Long Beach	31.7	6.9	4.1	8.6	1.7	10.7
Lynbrook	24.6	10.5	3.9	4.4	1.2	9.8
Malverne	22.0	12.5	4.3	3.2	1.7	9.8
Mineola	20.6	6.7	3.4	4.2	1.3	10.9
New Hyde Park	21.6	7.9	3.3	3.2	1.2	7.0
Oyster Bay	14.8	2.8	3.8	16.5	1.1	8.0
Rockville Centre	22.7	10.5	4.0	9.6	0.3	14.6
Sea Cliff	17.7	8.0	2.9	5.6	1.6	12.1
Valley Stream	21.4	10.5	4.1	2.9	1.5	7.4
Westbury	20.0	5.8	3.6	7.6	1.9	9.6
Williston Park	22.3	8.2	3.7	3.3	1.1	8.6

Figures given are based on worker's residence.

Source: U. S. Census, 1950.

TABLE 38

DISTRIBUTION OF COMPANIES AND EMPLOYMENT BY CLASS OF INDUSTRY
NASSAU AND SUFFOLK COUNTIES - 1955

Class of Industry	Number of Companies	Employment
Total	1,389	96,030
Durable Goods		
Aircraft and parts	34	38,400
Instruments and electronics	122	21,700
Fabricated metals and ordnance	175	9,200
Machinery and machine shops	162	5,700
Boatbuilding and repairing	52	600
Stone, clay and glass products	107	1,200
Total Durable Goods	650	76,800
Nondurable Goods		
Food products	140	1,250
Textiles	22	980
Apparel	100	5,150
Paper and paper products	10	970
Printing and publishing	121	5,350
Wood products	84	900
Furniture and fixtures	76	1,600
Leather and leather products	11	330
Chemicals (plastics, cosmetics, etc.)	76	1,300
Miscellaneous	135	1,400
Total Nondurable Goods	739	19,230

Source: New York State Department of Commerce
New York State Department of Labor

of the area, and attempts are being made to draw more stable industries into the area before the defense spending is cut back to the point that the industrial population finds itself without employment. Even with the slight increases that have been shown in the stable industries, it has been estimated that there will shortly exist a labor surplus of some ten thousand people.

The two predominant fields of employment in Nassau County are manufacturing and wholesale and retail trades; professional services and construction come next. How dependent the construction employment is upon the manufacturing employment picture remains to be seen, but certainly the wholesale and retail trades will suffer if manufacturing employments continue to drop. Although not shown, the average percentage of employment in public government is 4.9. To put it more plainly, the employment picture in Nassau County is too heavily weighted in the direction of unstable defense industry.

The following tables of employment were based on worker residence. The data in Tables 39 and 40 are based on the location of the employer's establishment. Table 41 gives the residence of employees in Nassau County industries for the year 1954 and points up the number who commute to Nassau County from other areas.

Unfortunately, employment statistics in the Nassau-Suffolk region are complicated by a number of factors which make the presumably identical information from one source disagree with that from another. A key factor in this difficulty is the importance of Farmingdale as a location of the center of the aviation industry. This community straddles the Nassau-Suffolk

TABLE 39

DISTRIBUTION OF MANUFACTURING EMPLOYMENT COVERED BY UNEMPLOYMENT INSURANCE LAW, SEPTEMBER 1952

NASSAU COUNTY AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Type	Total Nassau and Suffolk	Nassau	% of District Total
TOTAL	87,885	74,780	85.3
Ordnance and accessories	0		
Food and food products	1,280	721	
Tobacco manufactures	101	0	
Textile mill products	1,111	433	39.0
Apparel, cloth products	5,171	2,743	53.0
Lumber and products	649	510	
Furniture and fixtures	959	726	
Paper and paper products	658	627	
Printing and publishing	5,478	4,987	91.0
Chemical products	865	581	
Petroleum and coal products	54	54	
Rubber products	115	115	
Leather products	393	319	
Stone, clay and glass	928	799	
Primary metals	471	421	
Fabricated metal products	3,798	2,975	78.3
Machinery (except electrical)	2,169	1,614	74.4
Electrical machinery	2,170	1,296	59.7
Transportation equipment	39,997	35,907	90.0
Instruments and photo goods	18,492	17,516	94.7
Miscellaneous	3,026	2,436	81.0

· Percentages shown only major categories

Source: New York State Department of Commerce

TABLE 40

DISTRIBUTION OF EMPLOYMENT COVERED BY OLD AGE AND SURVIVORS INSURANCE LAW, MARCH 1951

NASSAU COUNTY AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Type	Total Nassau Suffolk	Nassau	% of Total District
TOTAL	155,783	120,672	77.5
Manufacturing	49,834	40,689	82.0
Mining	387	356	92.0
Contract construction	19,311	14,941	77.4
Public utilities	15,185	12,087	79.5
Wholesale trade	6,657	4,705	70.6
Retail trade	38,189	28,839	75.4
Finance, insurance and real estate	6,868	5,237	76.2
Services	16,305	11,800	72.4
Miscellaneous	3,047	2,018	66.3

Source: New York State Department of Commerce

TABLE 41

ORIGIN RESIDENCE OF EMPLOYEES IN NASSAU INDUSTRY AS A PERCENTAGE OF TOTAL EMPLOYMENT, YEAR 1954

Industry	Nassau	Suffolk	Queens	Balance of Metropolitan Area
	Percentage of Total Employment			
Manufacturing firms	52	18	17	13
Service and trade firms	70	15	10	5

Total Employees Manufacturing Firms 77,567

Total Employees Service and Trade Firms 21,552

Source: Vocational Education and Extension Board of Nassau

This shows that approximately 48 percent of the total manufacturing labor force comes from outside the County of Nassau. It is probable that the concentration of the aircraft industries at the eastern edge of the county accounts for the Suffolk residences.

While not as high as the manufacturing figure, the table shows that 30 percent of the total service labor force comes from without the county.

County line, and its employment is assigned to one or the other by different agencies.

Tables 42 through 45 provide additional employment data as supplied by the Research Section of the New York State Department of Commerce.

The employment data given in Table 42 are based on the residence in the counties. This gives a vastly larger employment total than the other three tables, which are based on the location of the job, since a large number of these suburban residents commute to work in New York City. The figures of Table 42 are taken from the decennial census of the population.

Table 43 is based on data from the census of the manufacturers. In the earlier census, no statistics were given by the counties on the total number of employees in factories, so that a historical trend can only be presented for production workers.

Table 44, extracted from County Business Patterns, gives employment data for all firms employing one or more employees covered by the Social Security Laws. The principal exclusions are railroad workers, government workers, agricultural workers, and non-profit institutions. Apparently these figures should be larger than those obtained from the Unemployment Insurance Statistics, which have similar coverage with the further exclusion of firms having less than four employees. Nevertheless, the figures in Table 44, for one county or for the combination of the two, are frequently larger than the corresponding figures in Table 45. This could be due to the fact that Old-Age and Survivors Insurance Program figures are for March of each year while those covered by Unemployment Insurance Law are annual averages. Failure to include firms of less than four employees in the later

table affects total employment more seriously than it does manufacturing employment.

It is unfortunate that the statistics for this area are so confusing and that there is no single source which can trace the full period from 1930 to the present consistently; however, the tables included in this section, if viewed with these limitations in mind, paint the picture of the employment characteristics and trends.

TABLE 42

EMPLOYED PERSONS
NASSAU AND SUFFOLK COUNTIES
1930, 1940, 1950

	Nassau County		Suffolk County	
	Total	Manufacturing	Total	Manufacturing
1930[1]	124,004	19,276	58,920	7,309
1940[2]	146,226	21,210	60,036	6,341
1950[2]	255,721	57,881	93,554	16,825

[1]Employed persons 10 years old and over.
[2]Employed persons 14 years old and over.

Source: United States Bureau of the Census.

TABLE 43

EMPLOYMENT IN MANUFACTURING
NASSAU AND SUFFOLK COUNTIES
1929, 1939 and 1947

	Nassau County		Suffolk County	
	All Manufacturing Employees	Production Workers	All Manufacturing Employees	Production Workers
1929	n.a.	3,611	n.a.	2,760
1939	n.a.	4,239	n.a.	3,115
1947	25,725	16,645	13,213	10,847

n.a. Not available.

Source: United States Bureau of the Census, Census of Manufacturers.

TABLE 44

EMPLOYMENT
UNDER OLD-AGE AND SURVIVORS INSURANCE PROGRAM
NASSAU AND SUFFOLK COUNTIES
Selected Years, 1946-1953

Data for March of Each Year

	Nassau County		Suffolk County	
Mid-March	Total	Manufacturing	Total	Manufacturing
1946	71,705	32,841	20,098	4,268
1947	76,065	27,779	24,030	5,228
1948	80,238	24,647	25,187	5,782
1949	n.a.	34,481	n.a.	7,363
1950	n.a.	39,749	n.a.	7,102
1951	120,672	40,689	35,111	9,145
1953	159,031	66,434	68,289	36,621

n.a. Not available.

Source: United States Department of Commerce, United States Department of Health, Education and Welfare.

TABLE 45

EMPLOYMENT
COVERED BY UNEMPLOYMENT INSURANCE LAW
NASSAU AND SUFFOLK COUNTIES
1942-1954

	Nassau County		Suffolk County	
	Total	Manufacturing	Total	Manufacturing
1942	n.a.	29,442	n.a.	14,941
1943	n.a.	53,338	n.a.	21,597
1944	n.a.	53,686	n.a.	19,128
1945	n.a.	43,155	n.a.	14,599
1946	n.a.	28,136	n.a.	12,146
1947	n.a.	23,864	n.a.	12,365
1948	n.a.	24,434	n.a.	12,137
1949	n.a.	27,863	n.a.	11,926
1950	n.a.	38,717	n.a.	6,119
1951	n.a.	55,899	n.a.	9,742
1952	155,285	71,785	37,833	12,287
1953	175,969	85,942	42,049	13,791
1954	186,888	90,519	43,771	13,037
1955 (6 mo. ave.)	183,741	82,795	45,199	13,529

n.a. Not available.

Source: New York State Department of Labor, Division of Employment.

Tables prepared in the New York State Department of Commerce, Division of Economic Development, April 3, 1956.

INCOME

Table 46 contains the breakdown of income groups by families for the year 1949. Table 47 contains the breakdown of income groups by families and unrelated individuals for the year 1949.[4] This information is based on a twenty percent sample as published in the 1950 census.

The data in Table 48 contains the breakdown of income payments to individuals, as reported by the New York State Department of Commerce, for the year 1952.[5] The income payments, where earned, by type of payment are based largely on reports by employers and thus represent income received by persons working in each county.

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[4]Families include groups of two or more persons related by blood, marriage, or adoption, and living together. Married couples living with relatives were considered part of the relatives' family, but a lodger and his wife or a resident employee and his wife are a separate family. Unrelated individuals are persons other than inmates of institutions not living with their families. The difference between the total number of families or individuals and the number reporting income represents those for whom no information was obtained on income; it does not represent the number who had no income.

The income figures given are defined as the net money income in 1949 of an unrelated individual or the combined net money income of all family members from wages and salaries, operation of a business or profession, rent and board, royalties, interest and dividends, pensions, government assistance, contributions for support, alimony and periodic receipts from insurance and annuities. Not included as income are non-cash items, such as food and free quarters. The statistics are probably low in level, for responses to the enumerator, mainly from memory, may not include the income of minor family members or from an occasional source. Half the families had incomes above the median and half below.

[5]Proprietor's income includes income of proprietors of unincorporated enterprises, such as farm operators, doctors, store owners, etc. Property income comes from interest, rent, dividends, and royalties. Other income payments are largely social insurance benefits, direct relief, allotments to military personnel, pensions, and veterans' bonuses.

Adjustment for persons who commute to work, resulting in income estimates by residents of the recipient, has been made in the county where such commuting appears to exist. Per capita income is based on the adjusted 1952 population estimates of the New York State Department of Health.

TABLE 46

NASSAU COUNTY INCOME IN 1949 OF FAMILIES ONLY COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Group	Nassau and Suffolk	Nassau
Total number of families	242,370	178,755
Number reporting	221,405	162,705
Median income $	4,230	4,524
Percentage Groups	Figures are the Percentages of Total	
Less than $2,000	12.9	10.5
$2,000 - $2,999	13.1	10.8
$3,000 - $3,999	19.7	18.9
$4,000 - $4,999	15.4	16.1
$5,000 - $6,999	19.4	21.1
$7,000 - $9,999	9.8	11.2
$10,000-and-over	9.6	11.5

Source: New York State Department of Commerce.

Note that the percentages for Nassau remain higher in the upper income brackets as compared with the area. The $10,000-and-over bracket for Nassau is considerably above the State average of 4.8. A goodly portion of this is no doubt attributable to the upper income families living in the incorporated villages but the major portion represents the higher standard of living that prevails throughout the county.

Under Motor Vehicle Registrations, "Other" includes commercial, trailer, ambulance, suburban, and motorcycle registrations. Bank deposits as of June 30, 1952, include time and demand deposits in commercial and savings banks, the deposits of a branch bank included in the county of the branch.

TABLE 47

NASSAU COUNTY INCOME IN 1949 OF FAMILIES AND UNRELATED INDIVIDUALS AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Group	Nassau and Suffolk	Nassau
Total number	288,930	210,090
Number reporting	262,290	189,910
Median income $	3,831	4,165
Percentage Groups	Figures are the Percentages of Total	
Less than $2,000	21.3	18.6
$2,000 - $2,999	13.4	11.3
$3,000 - $3,999	18.0	17.2
$4,000 - $4,999	13.6	14.4
$5,000 - $6,999	16.9	18.6
$7,000 - $9,999	8.4	9.7
$10,000-and-over	8.3	10.1

Source: New York State Department of Commerce.

Note that the percentages in the upper income brackets remain higher for Nassau as compared with the area. Again the $10,000-and-over share for Nassau is well above the State average of 4.0. It is natural that there should be some decrease in the median income when unrelated individuals are included, since the figures then include those persons in the lower income brackets who are not yet established in families.

TABLE 48

NASSAU COUNTY INCOME PAYMENTS TO INDIVIDUALS - 1952
AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Group	Nassau and Suffolk	Nassau
Total ($000,000)	1,551.3	1,176.2
Percentage Earned of Total by Group		
Wages and salaries	67.6	69.9
Proprietor's income	9.4	8.0
Property income	18.1	17.7
Other income payments	4.8	4.4
By Residence of Recipient		
Total ($000,000)	2,258.8	1,758.5
Per capita	2,169	2,361
Motor Vehicle Registrations, 1953		
Passanger cars	448,691	316,804
Other	86,653	51,384
Bank Deposits, June 30, 1952 ($000,000)	820	560

Source: New York State Department of Commerce

Note that while the percentage earned under wages and salaries for Nassau County is lower than the state average of 70.7, the Nassau figure is still above that of the average for the area. The per capita income in Nassau County is approximately two hundred dollars above that of the area; however, any attempt to compare per capita incomes is complicated by the fact that revisions upward in the population figures used for the 1952 estimate were made and included in the personal income data furnished in Table 49, containing the data for income during the year 1954. The differences between the per capita income in the 1952 and 1954 tables do not represent a change in income levels.

Table 50 shows the average employee earnings and hours for the Nassau and Suffolk County industrial workers. This table is included because it shows the latest available comparative figures on income for the area. The source of the table is the New York State Department of Labor, Division of Employment, Bureau of Research and Statistics.

HOUSING

The data in Table 51 illustrate the statement made earlier in this discussion with respect to the predominant types of dwelling unit and the period during which the greater number were constructed. Dwelling units are houses, apartments, flats, single rooms, or groups of rooms intended for occupancy as separate living quarters by more than one person constituting a household. A dwelling unit must have either cooking equipment or a separate entrance; but quarters meeting these requirements in transient accommodations are not included.

Occupied units had residents at the time of the enumeration or were

only temporarily unoccupied. A unit owned by one of its occupants was considered owner occupied. Seasonal and non-resident units are seasonally vacant or only temporarily occupied and are typically numerous in the resort areas. Year Built refers to the year of the original structure and not to subsequent expansion or remodeling.

Table 52 structures the dwelling units in the previous tables as to characteristics of the accommodations, heating, fuel, and cooking medium. Dwellings with private bath and toilet are the best units in each community. A "Dilapidated" structure is one having defects which render it unsafe or prevent the provision of adequate shelter. This data was published by the New York State Department of Commerce for the year 1950.

TRANSPORTATION

The primary mode of transportation in the area is the private automobile. In Nassau County the private vehicle registration has risen from approximately 210,000 in 1940 to 396,993 in 1955; this makes the present vehicle ratio of 2.5 persons per vehicle on the streets.

The map in Figure 7 shows the State and County road network that covers Nassau County. Many of the primary roads and all of the parkway systems have been built over the last twenty-five years in the race to keep abreast of the increasing need for good roads. However, Long Island, in general, is faced with the situation of a highway system that is inadequate to carry current traffic volumes.

In 1940 the State system of highways in the area consisted in some 416 miles of roadway serving a total population of only 604,000 people.

TABLE 49

ESTIMATED PERSONAL INCOME NASSAU AND SUFFOLK COUNTIES 1954
IN ($000,000) BY CATEGORY OF EMPLOYMENT

Group	Nassau	Suffolk
Wages and salaries	1,066.7	279.8
Property income	285.9	96.2
Farm income - Proprietor	4.8	8.1
Business and professional	89.4	41.7
Other income	93.3	34.5
Total Personal Income by Place of Residence		
Total	2,264.4	609.1
Per capita - Dollars	2,333	1,600
By Source of Income		
Farm income	8.8	18.0
Government income disbursements	170.8	90.2
Private nonfarm income	1,337.3	343.5

Source: New York State Department of Commerce

The difference in farm income between Nassau and Suffolk that exists at this time accentuates the more agricultural nature of Suffolk County. If figures for the last thirty years were available, they would show that at one time Nassau led in the farm income bracket. The switch to wage and salary earners from the farm bracket might well be watched in Suffolk as an indication of trends.

TABLE 50

EMPLOYEES, EARNINGS AND HOURS, HASSAU-SUFFOLK INDUSTRIAL AREA /a

Industry division and group	All employees /b (in thousands)		Production-workers averages					
			Weekly earnings		Hourly earnings		Weekly hours	
	Dec. 1955	Nov. 1955	Dec. 1955	Nov. 1955	Dec. 1955	Nov. 1955	Dec. 1955	Nov. 1955
Non-agricultural industries - Total	293.7	290.9						
Manufacturing	92.7	92.5						
Contract construction	26.4	27.1						
Transportation and public utilities	20.2	20.0						
Wholesale and retail trade	69.2	66.6						
Government	44.5	43.3						
Service and all other industries	40.7	41.4						
Manufacturing industries - Total	92.7	92.5	$ 86.60	$ 84.37	$2.08	$2.07	41.6	40.7
Durable goods	73.3	72.6	93.44	91.19	2.28	2.22	42.1	41.0
Fabricated metals (including ordnance)	6.5	6.4	100.38	94.45	2.24	2.19	44.8	43.0
Instruments and electrical equipment	22.3	22.1	84.28	81.43	2.09	2.04	40.4	39.9
Aircraft	36.8	36.2	101.02	100.18	2.37	2.40	42.7	41.8
Other durable goods	7.7	8.0	74.57	71.12	1.83	1.84	40.7	38.7
Non-durable goods	19.4	19.9	63.10	61.83	1.58	1.57	39.8	39.5
Food products	1.2	1.4	59.31	48.47	1.50	1.44	39.6	33.6
Textiles	1.1	1.1	64.04	64.14	1.55	1.54	41.3	41.6
Apparel	5.3	5.6	49.81	49.79	1.29	1.27	38.5	39.2
Printing and publishing	5.7	5.6	90.66	85.04	2.32	2.25	39.0	37.8
Other non-durable goods	5.9	6.2	66.77	67.20	1.61	1.63	41.5	41.3

/a Covers Nassau and Suffolk Counties.
/b Estimates adjusted to March 1954 benchmark. Because of rounding, detail may not add to totals.

Source: New York State Department of Labor

TABLE 51

NASSAU COUNTY DWELLING UNITS - 1950, BY NUMBER, YEAR BUILT, AND TYPE OF STRUCTURE AS COMPARED NASSAU-SUFFOLK DISTRICT

Group	Nassau and Suffolk	Nassau
Total Number	315,103	206,701
Occupied		
Number	260,158	188,629
Percent owner occupied	75.5	75.4
Seasonal and Non-residential	37,913	7,571
Percentage Distribution by Year Built		
1940 or later	34.5	38.0
1930 - 1939	21.5	19.5
1920 - 1929	25.2	27.3
1919 or earlier	18.8	15.1
Percentage Distribution by Type of Structure		
One family detached	82.7	79.0
Two family	9.9	11.4
Three to nine family	4.2	4.9
Ten family or more	3.2	4.6

Source: New York State Department of Commerce

The relatively high percentage of one-family detached dwellings is attributable to the type of development that has taken place in the area. The slightly higher percentage of multiple dwellings in Nassau as compared with our total area is no doubt due to the apartment building program that is spreading into Nassau from Queens County.

TABLE 52

NASSAU COUNTY DWELLING UNITS, 1950, BY CONDITION AND FUEL USED AS COMPARED TO NASSAU-SUFFOLK DISTRICT

Group	Nassau and Suffolk	Nassau
Percentage of Dwelling Units Reporting		
Total Number Reporting	235,735	178,055
Private bath and toilet Hot running water Not dilapidated	85.1	95.5
Mechanical refrigerator	95.1	96.8
Central heating	91.5	95.1
Percentage Using Specified Fuel		
Coal	23.0	19.8
Gas	8.5	9.5
Liquid	66.3	68.6
Other	2.1	2.1
Percentage Using Specified Cooking Fuel		
Gas	77.1	78.1
Electricity	10.0	10.1
Other	12.9	11.1

Source: New York State Department of Commerce

It is interesting to note that the Nassau average for private bath and toilet is well above the New York State average of 83.5 percent. The county is free of so-called slum areas except for a small section in the city of Glen Cove. This area is now being cleaned up as a result of the slum clearance program of the city.

Now, only fifteen years later, the population has increased by two hundred and fifty percent and yet the highway mileage has only increased some fifteen percent. During this same period, the automobile registration has better than doubled. The map in Figure 8 shows the existing highway and railroad picture for all of Long Island and is used to provide a complete picture of the system.

The prosperous living level of the area is reflected in the vehicle registration figures which show that 94% of the family units in the area own cars, as compared to the national average of only 64%. This picture only points up the need for increasing the primary road network to meet the ever-increasing demand; there is every indication that the trend will continue.

Before the days of the population expansion in the area, the highway system ran, for the most part, through rural areas. With the accelerated expansion and the resulting construction along the highways, the free flow of the traffic along these roads has been seriously impaired. The congestion caused by the additional intersections, parking, and the confusion resulting from left turn movements has reduced the highway capacity even more. It is now estimated that the open road which originally carried 1200 cars per hour per lane has been reduced to a maximum capacity of only 450 cars per hour per lane. The problem is aggravated by the increase in actual traffic volume on the main arteries which has increased from what was a peak volume of 15,000 cars per 24 hour period to present totals of 30,000 for the same period over the same stretch of road. The solution to the problem probably lies not only in improving the existing system, but

in the additional construction of first-rate highways over new routes. At present there is being planned a Long Island Expressway which will run the length of our area and be open to both commercial and private vehicular traffic. The Regional Plan Association has estimated that the construction of this artery will play an important part in the further dispersion of industry and population throughout the area, especially in Suffolk County.

Mass transportation is provided by several bus routes and the Long Island Railroad. The very shape of the Island dictates that the railroad route run generally east and west, and for the most part the major bus routes run across the island. In Nassau County there is a scheduled bus service between all the communities, provided by sixteen separate bus companies. In Suffolk County the bus service is not as complete, and the private vehicle is used even more extensively. The map in Figure 9 shows the scheduled bus routes in Suffolk County and the immediate area theoretically served by each route.

The Long Island Railroad is the only rail system operating in the area and has been in existence since 1834. It might be said that the railroad played a very important part in the early development of the island. Before the day of the automobile its existence made travel from Nassau County to New York a matter of an hour, rather than the day it took to make the trip by horse and buggy. Today, however, the railroad has fallen into public disfavor because of its antiquated equipment and old-fashioned, seemingly leisurely character, which have made it the butt of wits and pranksters. Unfortunately, the railroad has been the victim of a series of circumstances that placed it in financial difficulties. However, the present management has implemented a rehabilitation program that may revise the picture the

public has of its operations and equipment. If this should happen, there is always the possibility that the railroad will draw even more commuter traffic, thereby relieving the highway congestion somewhat. The problem here is time, in that by the time this eventuality is realized, there will be even more prople to handle. In spite of the fact that the public complains about the railroad, it carried over seventy-eight million passengers in 1954; thirteen million more than any other railroad in the country. It is estimated that this railroad carries one out of every five commuters in the United States. Although the road would probably like to see more than the present twenty-five percent of its total traffic in the more lucrative freight haul, it is doubtful that there will be any great increase unless there is a change in the nature of the island's industry. Today most of the industry is in the light category; however, the establishment of something like an automobile assembly plant anywhere on the island could change the situation.

HEALTH AND WELFARE

Water Supply

In Nassau County, where the population is in excess of one million, water needs are met by 32 municipal supplies, 7 private companies, and a number of private wells. These sources are called upon to supply an average requirement of about 100 million gallons per day.

In Suffolk County the average daily consumption is estimated at somewhat over thirty million gallons per day.

The water for the entire area is pumped from the ground at varying

FIGURE 7

STATE and COUNTY HIGHWAYS- NASSAU COUNTY

NASSAU COUNTY PLANNING COMMISSION

1 1/2 0 1 2 3 4 5

SCALE IN MILES

1952

NEW YORK STATE HIGHWAYS

NEW YORK STATE PARKWAYS

NASSAU COUNTY HIGHWAYS

STATE OF NEW JERSEY
LONG
ATLANTI
SMITHTOWN BAY
GREAT SOUTH BAY
UPPER BAY
LOWER BAY
JAMAICA BAY
BROOKLYN
QUEENS
BRONX
MANHATTAN
RICHMOND
LLOYD HARBOR
NORTHPORT BAY
HUNTINGTON
OLD BROOKVILLE
OLD WESTBURY
GARDEN CITY
JAMAICA
FLUSHING MEADOW PARK
PROSPECT PARK
FOREST PARK
BAILEY PARK
DYKER BEACH PARK
CANARSIE BEACH PARK
MARINE PARK
CONEY ISLAND
ROCKAWAY INLET
MUNICIPAL AIRPORT (IDLEWILD)
VALLEY STREAM STATE PARK
ROOSEVELT
HEMPSTEAD BAY
SOUTH OYSTER BAY
BELLPORT BAY
CAPTREE STATE PARK
FIRE ISLAND STATE PARK
TECKSMEN STATE PARK
NISSEQUOGUE
UNKEN MEADOW STATE PARK
JERICHO
CENTERACH
BAYPORT
LEGEND
EXISTING HIGHWAYS
PROPOSED HIGHWAYS
EXISTING PARKWAYS
PROPOSED PARKWAYS
COUNTY LINE
TOWN LINE
INCORPORATED VILLAGE
CITY
STATE PARK
RAIL ROAD
SUFFOLK COUNTY PLANNING BOARD
ERASTUS H. MUNSON
JAMES P. AMADEN
CHAIRMAN
ROBERT J. BARTLEY
GENEVIEVE B. EARLE
SETH A. HUBBARD
RUDOLPH M. KAMMERER
NORMAN W. McBURNEY
HENRY L. UNDERHILL
OTTO W. VAN TUYLE
JOHN M. MUDDEMAN
PLANNING CONSULTANT
HARRY T. TUTHILL EX OFFICIO
COUNTY SUPERINTENDENT OF HIGHWAYS
DATE DECEMBER 1954

MAP OF LONG ISLAND

SUFFOLK COUNTY PLANNING BOARD

NOTE · BASIS FOR THIS MAP TAKEN FROM MAP PREPARED BY ··
LONG ISLAND STATE PARK COMMISSION ··
ROBERT · MOSES · PRESIDENT ·

FIGURE 8

TRANSPORTATION MAP OF SUFFOLK COUNTY

SUFFOLK COUNTY PLANNING BOARD

ERASTUS H. MUNSON *Chairman* SETH A. HUBBARD
JAMES P. AMADEN RUDOLPH M. KAMMERER
ROBERT J. BARTLEY NORMAN W. McBURNEY
GENEVIEVE B. EARLE HENRY L. UNDERHILL
OTTO W. VAN TUYL

JOHN M. MUDDEMAN
Planning Consultant

HENRY T. TUTHILL *Ex Officio*
County Superintendent of Highways

FIGURE 9

NOTE: BASIS FOR THIS MAP TAKEN FROM SEVERAL SOURCES

levels. Since the sole supply is the ground water, it is dependent upon the rainfall and the amounts that are permitted to seep back into the earth.

The body of Long Island constitutes a natural collecting basin. Consisting of an intermixture of sand, gravel, and boulders sandwiched between alternating layers of somewhat pervious clays, it was deposited in successive steps by glacial and other geological activity upon the extended rock shelf of the continent in four fairly distinct strata. Ranging in depth up to 1500 feet along the Atlantic shore, these make up a watertable with four practically distinct levels. To reclaim the water, it is necessary to enter each strata separately. Nassau County draws seventy percent of its water from the third stratum down from the surface, while Suffolk County relies chiefly upon the upper strata.

The typical water supply system consists in a series of wells sunk into two or more of the strata in a manner not to interfere with each other. A pumping station draws from them feeding through light purification and treatment works to a network of pipes that extends into the community.

Nassau County, with an annual rainfall of forty-two inches, is the more critical of the two counties as far as water supply is concerned. Falling upon the 274 square miles of surface in the county, the precipitation adds up to about 550 million gallons per day; however, almost half of it is wasted as storm run-off into the Sound and the Atlantic, or is otherwise lost through evaporation and transpiration. The realizable maximum is a difficult thing to estimate, but it has been estimated at 270 to 342 million gallons per day, but only half of this figure may be safely withdrawn from the ground. The seriousness of this is that there exists a limit

beyond which Nassau County may not continue to deplete the natural water supply. Some authorities in the field have placed a limit of about 130 million gallons per day upon the ultimate development of Nassau County.

There have been signs that the limit has already been reached and even exceeded in certain areas. There have been cases of dropping water-table and salt intrusion in supplies along the south shore. As a conservation measure, a number of "recharge" basins have been constructed within the last few years. The purpose of these basins is to collect the run-off from storm water flows and hold it to seep back into the ground rather than run off into the Sound or the Atlantic. Under present regulations, any new development in Nassau County must provide as a part of the original construction phases sufficient recharge basins of an approved size and type to handle a specified percentage of the storm water.

Sanitation

The deep masses of sand underlying the area provide an excellent filtering medium, so that the water to the wells is of sanitary quality. There being no limestone in the area, the water is unusually soft for ground water. This very same sand also provides an excellent filter medium for the disposal of household and municipal wastes.

The cesspool is still the main means of disposing of sewage; however, several sewage treatment plants have been built that discharge to tidal waters. In general, the cesspool seepage flows through the layers of sand and the harmful bacteria are filtered out. This flow then augments the ground water supply and is available for water supply. The dark cloud on this otherwise favorable picture is that the constant oxidation of the

organic parts of the sewage in the filtering medium results in increasing quantities of nitrates, which can be dangerous. In addition, the carbon dioxide formed increases the corrosive properties of the ground water. There are areas in the county where these concentrations have been reported in sufficient quantity to necessitate corrective measures. The City of New York takes some of its water supply from wells along the south shore of Nassau County, and there has been a substantial increase in the carbon dioxide count in these wells.

Since the area depends entirely upon the ground water for its supply, very careful control must be maintained over industrial wastes; the most dangerous to the supply are any wastes from metal-plating processes.

The cesspool system is an accepted method of disposing of wastes in sparsely populated areas, but it is almost impossible to conceive that the area can long be without adequate treatment facilities.

Medical

The New York State Department of Social Welfare has published the figures given in Table 53 covering the extent of medical services available in Nassau and Suffolk Counties. They include beds in hospitals open to the general public, except hospitals for the chronic, tubercular, and mental patients. Among hospitals considered not available to the general public are those operated by the state or federal government, or restricted to the membership of fraternal or other organizations.

In 1950 Nassau County created an emergency medical service which gives people twenty-four hour coverage; a medical counseling service where

TABLE 53

NASSAU AND SUFFOLK COUNTY MEDICAL SERVICES (AS OF DATE SHOWN)
BY HOSPITAL BEDS, PHYSICIANS, AND DENTISTS

County and Community	Hospital Beds March, 1949	Physicians June, 1948	Dentists 1948
Nassau-Suffolk Total	2,096	1,391	690
Nassau County	1,139	971	519
Floral Park	18	26	15
Freeport	31	65	32
Garden City	0	36	18
Glen Cove	105	32	20
Hempstead	267	113	55
Long Beach	53	32	22
Lynbrook	0	37	30
Mineola	223	14	7
Rockville Centre	235	83	51
Valley Stream	0	31	17
Suffolk County	957	420	171

Source: New York State Department of Commerce

These figures are for the period prior to 1950. Admittedly, there has been considerable growth in the size of the population to be serviced. but there has been no great surge in the building of additional hospital space, although in the past year there have been several additions to this group. 1955 figures published by the county put the number of practicing physicians at 2,000 for the year.

These figures are included to show the relative distribution of facilities in the area.

people can go without charge for advice and guidance as to how to secure medical services for whatever professional, medical, or economical problem might exist; a mediation committee to which patients may come with complaints regarding the nature and fees of medical services rendered by a doctor; a workable and adequate blood bank. The establishment of the above services for the people of the county is regarded as unique and has proven quite satisfactory.

On a nationwide basis, the county is recognized as having outstanding community health service programs in standard setting for nursing homes and related medical care facilities, in generalized public health nursing and cancer nursing, in accident prevention, and in maternal and child health services.

Parks

In the last twenty-five years the Long Island State Park Commission has developed several excellent beach parks along the shore. These parks provide recreation areas for many thousands of New York City residents and county dwellers during the summer months. It has also constructed one of the finest parkway networks in the country.

In addition, the county is developing what may well be one of the largest single park projects in the country, on the Salisbury Plains lying to the south of Westbury. The purpose of this park is to provide the people of Nassau County with major recreational features not possible in the smaller town or village parks. Although still under construction, this area attracted over 500,000 visitors in 1954.

The several park areas that are developed or under development will

do much to preserve adequate recreational space, but the old drawing card of the island "wide open spaces" is fast losing its meaning, except in eastern Suffolk County beyond the limits of the extensive settlement.

With the disappearance of the large green areas on the island, those in planning authority will do well to exert their influence to reserve sufficient green areas within the various communities before and during their development; it is almost impossible to correct the loss of these spaces after construction has swallowed them up. The Nassau County Department of Public Works has done much along this line by developing small parks on brooks and storm drainage channels, at bridge approaches and highways, at storm water storage basins, and around public buildings; however, the need for small recreational areas within the villages and communities is becoming imperative, if for nothing else than to keep the children off the streets.

Education

The rapid rate of population growth in the area, combined with the unusually high birth rate of the past few years, has overtaxed the school systems of both Nassau and Suffolk Counties, even though the local communities have entered into building programs that have strained their financial capabilities.

During the depression years, the planners were concerned lest the low birth rates of the period result in an unbalanced population, and in 1940 the census revealed that there were fewer children under five than there had been the year before, although the total population had increased over nine million; however, from then on the birth rates began to rise.

In Nassau County the birth rate in 1950 was 16,292 and by 1954 it had climbed to 24,476. The estimates for 1955 place it at 26,000. When one considers that these figures translate into physical school requirements, it can readily be seen that in Nassau County alone the need for the construction of facilities to handle an additional two thousand children each year has been reached and probably will continue. The problem is one that is nationwide, as can be seen from the Census Bureau report in the summer of 1955 to the effect that one third of the total national population is under eighteen years of age.

In the efforts to meet the increasing demands in Nassau and Suffolk Counties, local communities have expended 280 million dollars in the period from 1950 through 1954 for the construction of school buildings. Compared with the total expenditures for the state, this area expended twenty-five percent of the statewide total. In spite of this heavy outlay, it has been estimated that demands for school building construction during the period from 1955 through 1959 will total an additional 245 million dollars and will provide for an additional 14,000 students. Table 54 shows the building costs, pupil capacities, and outstanding debt for Nassau and Suffolk Counties for the above periods.

A recent survey by the Nassau County Board for Vocational and Extension Education indicates that there is an increasing need for special or vocational facilities at the high school level which is in addition to the basic school needs.

It is estimated that the number of high school graduates in the two counties will increase from the 9,100 of 1953-54 to about 47,000 by

1969-70. These figures have been generally regarded as conservative, and the situation with respect to higher education will definitely become more serious since there is only one State College, the Long Island Agricultural and Technical Institute at Farmingdale, and four private colleges, Adelphi. Hofstra, Molloy, and the C. W. Post College of Long Island University. It is quite probable that additional state assistance and support will result in the establishment of other facilities in the area.

The acuteness of the situation with respect to the primary and secondary schools can easily be seen from Tables 55 and 56. These tables show the school registration figures for the years 1950-51 thorugh 1954-55 for both Nassau and Suffolk Counties and the number of students in the primary and secondary grades that are being housed under substandard conditions. The enrollment in both counties increased by 65% for this period, but the greater number in substandard conditions exists in Nassau County.

One of the greatest problems facing the planners is the financing of the required facilities. Up to the present time, the greater portion of the taxes has been derived from real property taxes levied against properties that are mainly residential in nature. It is true that there has been an increase in mercantile and industrial properties in some areas, but many of the communities must rely entirely on the residential property. This situation has run the school tax rate way out of reason, until in certain areas it may run as high as ninety dollars per thousand. There has been considerable assistance in the way of financial state and federal aid poured into the area, but just how much can be gained in this way remains to be seen. One thing is certain: the rapid influx of people and the high

rate of natural increase have created a problem that will be with the area for a long time. An official of one school district has said that his children are attending school under substandard conditions and that no matter how fast new facilities are built, they will not be finished in time for his children to benefit assuming that work starts on the primary schools first. The map in Figure 10 shows the location and types of primary and secondary school facilities existing in the county in 1955.

TABLE 54

SCHOOL BUILDING COSTS AND PUPIL CAPACITIES AND OUTSTANDING DEBT IN NASSAU AND SUFFOLK COUNTIES, 1950-54 AND 1955-59

Years	Nassau	Suffolk
1950-1954		
Pupil capacity	122,630	26,052
Cost	$234,272,614	$46,375,579
Outstanding debt as of 31 December 1954	$199,326,343	$35,804,150
1954-1959 - Estimated Need		
Pupil capacity	69,280	73,806
Cost	$121,650,190	$123,973,240

Source: New York State Department of Education

TABLE 55

SCHOOL REGISTRATION IN NASSAU AND SUFFOLK
1950 - 1955

Year	Nassau	Suffolk
1950-51	123,292	45,055
1951-52	141,603	50,106
1952-53	167,442	58,128
1953-54	190,049	66,342
1954-55	210,000	73,000

Source: New York State Department of Education

TABLE 56

SCHOOL ENROLLMENTS HOUSED UNDER SUBSTANDARD CONDITIONS IN NASSAU AND SUFFOLK COUNTIES - 31 DECEMBER 1954

County and Conditions	Grade Groups - Pupils In		
	Total	K-6	7-12
Nassau			
Half time or double session	52,538	37,936	14,602
Triple session	4,271	4,271	0
Rental quarters	2,425	2,301	124
Substandard classrooms	5,623	4,460	1.163
Oversized classes	68,782	40,294	28,488
Suffolk			
Half time or double session	17,252	11,424	5,828
Triple session	64	64	0
Rental quarters	4,334	4,225	79
Substandard classrooms	2,832	1,893	939
Oversized classes	20,282	10,339	9,943

Source: New York State Department of Education

While it can probably be expected that the figures for the deficiencies in the K-6 group will not drop, it must be recognized that these figures will move up into the 7-12 group in the next few years, thereby creating the same shortages that now exist in the lower grades.

FIGURE 10

SCHOOL DISTRICTS and SCHOOLS - NASSAU COUNTY

NASSAU COUNTY PLANNING COMMISSION

1 1/2 0 1 2 3 4 5

SCALE IN MILES

1955

NOTE: BASIC INFORMATION OBTAINED FROM DISTRICT SUPERVISORS AND SCHOOL DISTRICT OFFICIALS.

- ○ ELEMENTARY SCHOOL SITE
- ● ELEMENTARY SCHOOL
- △ JR. HIGH SCHOOL SITE
- ▲ JR. HIGH SCHOOL
- □ HIGH SCHOOL SITE
- ■ HIGH SCHOOL

NASSAU

Summary and Trends

The preceding paragraphs have presented a detailed picture of the characteristics, development, and growth of Nassau County, outlining the community structure upon which to superimpose the aircraft industry, Grumman in particular, pointing out that the growth of the area, which it helped to bring about, may force that industry to seek new areas for plant relocation and expansion. This is borne out by Grumman's recent expansion to Suffolk County.

The forecasters estimate that the population in Nassau County will probably climb to approximately 1,400,000 by 1965 and that employment will reach 500,000. The problem of housing these people and of providing the community facilities for them is an urgent one. There were 126 square miles of developed residential land in 1954: fortunately, the single family unit that has been responsible for the greater part of existing development has kept down the density to twelve persons per gross residential acre. There remain only 124 square miles of vacant land that is suitable for residential development. The Regional Plan Association estimates that the increase in developed residential area will be 101 square miles for the period 1954 to 1975. Unless the characteristics of the area change, the county will reach its saturation point by 1975.

One might expect that substandard residential areas would grow around the industrial areas, but in Nassau County there is reason to believe that county and local planning authorities will be able to prevent this. Of the steps being taken, one is to insist that the architectural treatment

of the physical plant facilities be such as to fit the plant into the area without blemish. An excellent example of this is the Sperry Plant at Lake Success.

The present trend is for new industry to locate along the railroad. The length of the railroad across Nassau County is blanketed with the strip type of industrial development. There is no reason to believe this trend will change, except for the increasing efforts to concentrate industry in preplanned areas, such as Roosevelt Park and Locust Grove.

There are local shopping centers growing along the major highways, interspaced with general commercial establishments in what can be called an almost continuous strip pattern.

One of the best measures of actual development is the statistics with regard to building activity. The tabulations in Tables 57 and 58 contain the summaries of activity for the towns and cities in the county for the years 1946 to 1955, as supplied by the Nassau County Planning Commission. This tabulation is broken down by type of structure and town. There are two sets of figures: those for the building permits issued, and those for the actual certificates of occupancy. The differences between the number of permits issued and the number of certificates can be due to the time taken for construction and may also represent some speculation.

A close look at these figures shows that the peak in residential construction and occupancy was reached in 1950 to 1952, whereas there has been a consistent though slow growth in the number of industrial permits. This bears out the contention that there are new industries continually moving into the county. If one were to look at the subdivision maps of the county for 1951 and 1955, one would see that available vacant land is fast

disappearing in all areas except within the incorporated villages in the northern part of the county.

In the area immediately adjacent to the site of the Bethpage Grumman plant the assessed valuation in school district No. 21 has increased from: $2,449,150 in 1930
to $4,215,935 in 1940
and $24,710,640 in 1955

Total county assessed valuation increased:
$1,131,641,804
to
$2,265,878,262

Under the existing laws, each incorporated village and city is responsible for its own planning, the County Planning Commission exercising jurisdiction only in the unincorporated areas. Such an arrangement cannot always result in a well-coordinated effort. The system as established has operated rather well up to now, but the people of Nassau must soon face the fact that there can only be satisfactory over-all development within the framework of some master scheme as controlled by a central planning authority. Unless some such arrangement is forthcoming, there can be no assurance that necessary integration is achieved. The writers make no attempt to discuss the political difficulties involved, other than to point out that recent legislation was proposed in an effort to reduce the County Planning Commission to a mere advisory body, with no authority; this indicates that some of the leaders of the communities are only interested in local considerations, rather than in those of the county as a whole. The writers personally believe that planning authority and control should be vested in a central group, preferably devoid of politics. It is true that this would spell the doom of "Home Rule," but the urbanization of the county is rapidly progressing to a point where centralized control of certain aspects of the county government must become a reality.

TABLE 57.

NASSAU COUNTY - BUILDING PERMITS ISSUED
Years 1946 - 1955

Source: Nassau County Planning Commission

	1-family dwellings	Other types dwellings	Business buildings	Industrial buildings
1946				
Town of Hempstead	5467	231	211	19
Town of North Hempstead	3032	9	97	24
Town of Oyster Bay	714	6	67	14
City of Glen Cove	167	0	14	3
City of Long Beach	492	13	20	3
County Totals	9872	259	409	63
1947				
Town of Hempstead	8995	732	280	15
Town of North Hempstead	2600	634	127	31
Town of Oyster Bay	1040	22	64	4
City of Glen Cove	134	0	4	1
City of Long Beach	331	108	8	0
County Totals	13100	1496	483	51
1948				
Town of Hempstead	11920	561	334	19
Town of North Hempstead	1956	184	123	23
Town of Oyster Bay	2111	13	45	8
City of Glen Cove	257	100	11	0
City of Long Beach	138	210	3	1
County Totals	16382	1068	516	51
1949				
Town of Hempstead	12522	1405	320	17
Town of North Hempstead	2734	1392	94	26
Town of Oyster Bay	3015	31	68	8
City of Glen Cove	98	213	0	1
City of Long Beach	275	171	6	1
County Totals	18644	3212	488	53
1950				
Town of Hempstead	16619	727	394	28
Town of North Hempstead	4499	517	149	22
Town of Oyster Bay	8039	32	125	21
City of Glen Cove	246	0	8	0
City of Long Beach	261	367	15	0
County Totals	29664	1643	691	71

cont'd.

TABLE 57 - cont'd.

	1-family dwellings	Other types dwellings	Business buildings	Industrial buildings
1951				
Town of Hempstead	11641	194	240	64
Town of North Hempstead	2220	95	104	53
Town of Oyster Bay	3941	4	79	41
City of Glen Cove	270	0	5	0
City of Long Beach	105	120	2	0
County Totals	18177	413	430	158
1952				
Town of Hempstead	8928	280	331	54
Town of North Hempstead	2292	68	84	69
Town of Oyster Bay	7572	3	119	13
City of Glen Cove	249	0	3	2
City of Long Beach	137	106	2	0
County Totals	19178	457	539	138
1953				
Town of Hempstead	7799	165	279	64
Town of North Hempstead	1923	144	91	16
Town of Oyster Bay	8554	24	147	14
City of Glen Cove	167	0	9	0
City of Long Beach	80	306	4	0
County Totals	18523	639	530	139
1954				
Town of Hempstead	6274	783	262	68
Town of North Hempstead	1867	403	102	55
Town of Oyster Bay	8180	0	129	12
City of Glen Cove	232	3	19	6
City of Long Beach	81	359	2	0
County Totals	16607	1509	514	141
1955				
Town of Hempstead	5439	669	293	77
Town of North Hempstead	1641	297	105	42
Town of Oyster Bay	7236	5	111	46
City of Long Beach	47	160	5	0
City of Glen Cove	241	149	6	7
County Totals	14604	1280	520	172

TABLE 58

NASSAU COUNTY - CERTIFICATES OF OCCUPANCY ISSUED BY TOWNSHIP CITY, AND UNINCORPORATED AREAS, YEARS 1946-1955

Source: Nassau County Planning Commission

	1-family dwellings	Other types dwellings	Business buildings	Industrial buildings
1946				
Town of Hempstead	2121	120	44	14
Town of North Hempstead	2268	6	47	15
Town of Oyster Bay	202	4	16	7
City of Glen Cove	30	0	8	2
City of Long Beach	156	5	7	2
County Totals	4777	135	122	40
1947				
Town of Hempstead	6617	63	173	10
Town of North Hempstead	3296	238	63	9
Town of Oyster Bay	622	6	6	0
City of Glen Cove	160	0	6	2
City of Long Beach	173	7	3	0
County Totals	10868	314	251	21
1948				
Town of Hempstead	11134	157	145	11
Town of North Hempstead	1933	329	86	16
Town of Oyster Bay	1442	10	5	1
City of Glen Cove	105	0	0	0
City of Long Beach	188	142	18	0
County Totals	14802	638	254	28
1949				
Town of Hempstead	11357	507	213	24
Town of North Hempstead	2453	84	84	21
Town of Oyster Bay	1918	16	57	15
City of Glen Cove	223	0	0	1
City of Long Beach	283	207	11	0
County Totals	16234	814	365	61

cont'd.

TABLE 58 - cont'd

	1-family dwellings	Other types dwellings	Business buildings	Industrial buildings
1950				
Town of Hempstead	11818	605	199	20
Town of North Hempstead	3573	888	71	18
Town of Oyster Bay	5926	0	21	2
City of Glen Cove	96	0	0	0
City of Long Beach	225	279	12	1
County Totals	21638	1772	303	41
1951				
Town of Hempstead	14696	286	204	40
Town of North Hempstead	2850	257	90	32
Town of Oyster Bay	4373	12	46	12
City of Glen Cove	322	0	0	0
City of Long Beach	154	379	5	0
County Totals	22395	934	345	84
1952				
Town of Hempstead	7048	495	263	33
Town of North Hempstead	1995	13	64	56
Town of Oyster Bay	4394	1	18	0
City of Glen Cove	172	2	2	1
City of Long Beach	117	98	9	0
County Totals	13726	609	358	90
1953				
Town of Hempstead	7890	179	247	60
Town of North Hempstead	1881	66	73	54
Town of Oyster Bay	6786	14	71	15
City of Glen Cove	109	0	3	2
City of Long Beach	94	304	5	1
County Totals	16760	563	399	132
1954				
Town of Hempstead	7009	321	254	47
Town of North Hempstead	1834	75	81	57
Town of Oyster Bay	7605	0	44	1
City of Glen Cove	185	5	2	3
City of Long Beach	79	256	9	0
County Totals	16712	657	390	108

cont'd.

TABLE 58- cont'd.

	1-family dwellings	Other types dwellings	Business buildings	Industrial buildings
1955				
Town of Hempstead	5492	450	224	63
Town of North Hempstead	1620	105	61	44
Town of Oyster Bay	8024	1	16	1
City of Glen Cove	269	10	0	2
City of Long Beach	49	400	17	1
County Totals	15454	966	318	111

1946	Total building permits for family units	10131
	Total certificates of occupancy for family units	4912
1947	Total building permits for family units	14596
	Total certificates of occupancy for family units	11182
1948	Total building permits for family units	17450
	Total certificates of occupancy for family units	15440
1949	Total building permits for family units	21856
	Total certificates of occupancy for family units	17048
1950	Total building permits for family units	31307
	Total certificates of occupancy for family units	23410
1951	Total building permits for family units	18590
	Total certificates of occupancy for family units	23329
1952	Total building permits for family units	19806
	Total certificates of occupancy for family units	14363
1953	Total building permits for family units	19038
	Total certificates of occupancy for family units	17209
1954	Total building permits for family units	17954
	Total certificates of occupancy for family units	17179
1955	Total building permits for family units	15713
	Total certificates of occupancy for family units	16213

Of note is the fact that over seventy-five percent of the total number of permits issued during the last five years were for building in the unincorporated areas of Hempstead and Oyster Bay.

SUFFOLK COUNTY

Suffolk County was first settled in 1640 by English settlers from New England who established themselves in the areas now known as Southold and Southampton. In 1683 the county was organized and has remained as such through the years. Politically, the county is made up of ten towns or townships, twenty-seven incorporated villages, and a number of smaller communities under the town government. The county covers some 920 square miles of land. The limits of the county and the subdivisions within the county are shown in Figure 9.

GOVERNMENT

The county is governed by a Board of Supervisors that is made up of the supervisors of each town. (The words town and township are synonymous.) The Board elects one of its members to serve as the chairman of the County Board of Supervisors.

Town officials are elected by the people within the town as needed and consist of a Town Supervisor, Superintendent of Highways, Receiver of Taxes, Town Clerk, and several Justices. The Town Board legislates for the unincorporated areas, which actually comprise the majority of the county, see Figure 9. They establish zoning and other ordinances, set up boards of zoning appeal, and maintain supervision over the various departments of the town.

The schools within the county are controlled by local school boards who are elected by the district they serve. The budgets of each of these districts are met by taxes based on the evaluations placed on land, homes, and business establishments within the district.

Each of the towns of Suffolk County has its own police force, which operates within the limits of the town. Augmenting these forces are the County Sheriff and the County District Attorney. The county seat is located at Riverhead.

Except in the villages (where the village board elects and passes on the budget), each community has its own fire department and elects its own commissioners, who govern the budget and conduct the affairs of the department. Suffolk County has one of the highest concentrations of modern fire-fighting equipment per capita in the country today.

With the enactment by the State Legislature, in its last session, of the bill for an executive type of government for Suffolk County under a charter, the existing system will give way, and the new government structure will parallel that now in force in Nassau County.

A detailed discussion of the structure and characteristics of Suffolk County is necessary to enable comparisons with Nassau County.

POPULATION

Although Suffolk County is still the number one dollar-earning agricultural county in New York State (ranking 47th nationally), its population growth is changing the rural picture to one of semi-rural, suburban, and even urban characteristics. In 1950 the census showed a population in Suffolk of 276,129; records compiled by local town governments and public utilities show an accurate population count for 1 January 1955 of over 412,000 persons, an increase in population of 49.2% in five years.

Long term growth is readily shown by a look at the census figures

for Suffolk County from 1900 to 1950 and the 1956 estimate:

Census: Suffolk County

1900	77,582
1910	96,130
1920	110,246
1930	161,055
1940	197,355
1950	276,129

Long Island Lighting Company
Estimate for 1 January 1956

452,083

In 1920 Suffolk County fell behind Nassau County in total population. The more rapid growth in Nassau County since then has resulted in its total being 2.9 times the total for Suffolk County.

The New York Regional Plan Association has published the following figures on the sources of the population change within the county:

Natural Increase and Net Migration

Period	Natural Increase	Net Migration
1930-1940	4,900	31,400
1940-1950	16,000	63,000
1950-1954	14,500	88,900

Needless to say, the in-migration into the area has accounted for the major portion of the total population growth. From these figures we can see that the rate of natural increase and net migration has tripled since 1930. The population growth falls into the same two categories that were described for Nassau County. As a matter of fact, the western towns of Huntington and Babylon are rapidly growing to resemble the adjacent area of Nassau County, while the eastern towns are still primarily agricultural in nature, with the intermediate towns of Smithtown and Islip in the stages of transition.

The latest population distribution map for the county is that prepared by the Suffolk County Planning Board, see Figure 11. This distribu-

DISTRIBUTION OF POPULATION MAP OF SUFFOLK COUNTY

SUFFOLK COUNTY PLANNING BOARD

ERASTUS H. MUNSON *Chairman* — SETH A. HUBBARD
JAMES D. AMADEN — RUDOLPH M. HAMMERER
ROBERT J. BARTLEY — NORMAN W. McBURNEY
GENEVIEVE B. EARLE — M. SCUDDER GRIFFING
OTTO W. VAN TUYL

JOHN M. MUDDEMAN
Planning Consultant

ALBERT B. CASS · SUPERINTENDANT OF HIGHWAYS

SOURCE: SUFFOLK COUNTY PLANNING BOARD, PROGRESS REPORT 1955

FIGURE 11

tion map shows clearly the concentrations that are building up in the western end of the county; these are the result of the overflow from Nassau communities forced eastward by the pressures from the west (New York City). The statements previously made with respect to the incorporated villages and population distribution in Nassau County hold true for Suffolk County as well. The difference in this respect is the lower percentage of total land within the incorporated villages in Suffolk County.

Tables 59 through 62 contain tabular breakdowns of the population in Suffolk County with respect to number, dwelling units, and distribution by age, for the year 1950, as reported by the New York State Department of Commerce. The data in these tables are based on the same premise as stated for Tables 1 through 5 for Nassau County. See footnote No. 1.

The data on households (1950) for Suffolk County are as follows: Total number - 71,652; population in household - 236,860; people per household - 3.31; inmates of institutions - 33,850. There are no figures available for a breakdown of these figures by community.

From these tables we see that Suffolk County people are on the average older than the people of Nassau County (35.6 as against 31.3), the size of families is smaller (3.31 persons as against 3.51), and the educational average is lower (10.1 years against 12.1 years of school). However, the size of families and the educational level for Suffolk County is still above the state averages of 3.27 persons per family and 9.6 years of school.

Comparing the average rentals for Suffolk County with those in Nassau County, we find that the rentals for the Suffolk County units are considerably lower, as are the valuations. This becomes more pronounced as one moves eastward to the more predominantly rural and agricultural areas of the county.

TABLE 59

SUFFOLK COUNTY POPULATION DISTRIBUTION BY COMMUNITIES OF OVER 2500 FOR YEAR 1950

County and Community	Number of Persons	Population in 1950				Persons 25 Years and Over
	1950	Urban	Rural Nonfarm	Rural Farm	Percent Female	Median School Years Completed
Suffolk County	276,129	121,883	144,558	9,688	50.4	10.1
Amityville	6,164	6,164	.....	.....	52.8	12.0
Babylon	6,015	6,015	.....	.....	52.8	11.7
Bay Shore	9,665	9,665	.....	.....	51.8	10.6
Brentwood	2,803	2,803	.....	.....	49.5	9.3
Central Islip	3,067	3,067	.....	.....	50.7	11.3
East Islip	2,834	2,834	.....	.....	51.7	9.6
East Northport	3,842	3,842	.....	.....	50.4	10.0
East Patchogue	4,124	4,124	.....	.....	50.2	10.6
Greenport	3,028	3,028	.....	.....	50.6	9.8
Huntington	9,324	9,324	.....	.....	51.6	11.7
Huntington Station	9,924	9,924	.....	.....	49.6	9.3
Islip	5,254	5,254	.....	.....	51.7	9.9
Kings Park	10,960	10,960	.....	.....	50.0	9.9
Lindenhurst	8,644	8,644	.....	.....	50.0	8.9
Northport	3,859	3,859	.....	.....	51.7	12.0
Patchogue	7,361	7,361	.....	.....	51.4	9.6
Port Jefferson	3,296	3,296	.....	.....	52.4	10.5
Riverhead	4,892	4,892	.....	.....	51.3	9.8
Sayville	4,251	4,251	.....	.....	51.8	11.1
Southampton	4,042	4,042	.....	.....	51.7	10.4

Source: U. S. Census, 1950

TABLE 60

SUFFOLK COUNTY DISTRIBUTION OF POPULATION BY AGE
COMMUNITIES OVER 2500 FOR YEAR 1950

County and Community Population 2500 & over	Median Age	Under 5 Years	5-14 Years	15-24 Years	25-44 Years	45-54 Years	55-64 Years	65 Years and Over
SUFFOLK	35.6	9.2	13.5	11.5	30.3	14.1	11.4	10.0
Amityville	37.8	8.8	13.0	10.0	29.9	13.5	11.6	13.2
Babylon	35.2	9.2	14.4	11.8	29.7	15.0	9.6	10.2
Bay Shore	33.3	9.2	14.3	13.7	30.0	14.0	9.9	8.8
Brentwood	33.8	9.4	17.2	11.7	30.3	12.9	9.2	9.2
Central Islip	27.6	15.2	17.6	12.1	34.1	8.9	6.7	5.5
East Islip	34.8	8.0	14.1	14.4	29.4	13.5	10.3	10.3
East Northport	33.1	11.5	15.6	10.3	31.9	12.1	10.7	7.9
East Patchogue	31.7	11.5	15.2	12.0	31.4	13.1	8.9	7.9
Greenport	35.8	8.4	15.1	12.7	27.5	12.4	12.3	11.7
Huntington	33.7	9.9	14.6	11.9	31.6	13.2	9.4	9.3
Huntington St.	30.6	11.2	16.0	13.3	32.7	12.3	8.3	6.2
Islip	34.0	9.5	14.9	12.4	30.1	13.8	10.2	9.1
Kings Park	46.2	1.9	5.1	9.0	31.5	20.6	17.5	14.3
Lindenhurst	30.8	11.3	15.2	13.6	31.9	12.1	9.3	6.5
Northport	34.6	10.5	14.8	10.5	31.0	12.7	9.7	10.7
Patchogue	34.1	8.9	13.5	13.8	29.5	13.3	10.4	10.6
Port Jefferson	32.2	9.2	18.6	11.9	28.2	11.8	10.5	9.9
Riverhead	32.8	10.2	15.1	13.7	32.2	11.9	9.8	9.2
Sayville	35.4	9.1	15.0	11.4	29.3	13.2	11.4	10.5
Southampton	35.2	9.1	14.0	15.1	28.8	12.6	10.9	11.5

Source: U. S. Census, 1950

Age distribution is relatively constant throughout the county except for Kings Park; which may be due to the number of retired people among the residents and the fact that it has not grown, but remained static.

TABLE 61

SUFFOLK COUNTY DISTRIBUTION OF POPULATION BY AGE, 1950
TOWNS AND COMMUNITIES 1,000 - 2,500

Un = Unincorporated Village V = Incorporated Village

Community	Total	Percentage of the Total Population				
		Under 15 Years	15-24 Years	25-54 Years	55-64 Years	65 Years and Over
Bayport Un	1,463	24.4	10.3	43.7	10.5	11.1
Bellport V	1,449	25.7	11.2	45.8	8.0	9.2
Blue Point Un	1,613	26.9	12.1	42.7	9.2	9.1
Brightwaters V	2,336	27.8	8.4	46.5	9.6	7.7
Cen. Moriches Un	1,761	26.7	12.7	41.5	8.7	10.4
East Hampton V	1,737	20.8	9.7	42.4	12.7	14.5
Eastport-Speonk Un	1,042	24.4	13.5	42.0	11.0	9.0
Greenlawn Un	1,000	28.7	9.0	44.2	9.3	8.8
Hagerman North Bellport Un	1,605	25.6	14.5	42.9	8.8	8.2
THE TOWNS OF SUFFOLK						
Babylon	45,556	26.4	12.9	43.9	9.1	7.7
Brookhaven	44,552	25.3	12.1	42.3	10.5	9.9
East Hampton	6,352	23.8	12.2	41.6	11.5	10.8
Huntington	47,506	24.4	11.3	45.9	10.7	7.7
Islip	71,465	18.1	9.9	46.4	13.3	12.3
Riverhead	9,973	27.0	14.2	41.3	9.1	8.3
Shelter Island	1,144	23.1	8.4	38.4	16.1	14.1
Smithtown	20,993	16.9	10.1	47.3	14.2	11.5
Southampton	16,830	23.7	12.7	41.6	11.3	10.7
Southold	11,632	24.3	12.2	40.3	11.3	11.9

Source: U. S. Census, 1950

TABLE 62

SUFFOLK COUNTY DISTRIBUTION OF DWELLING UNITS, 1950
TOWNS AND COMMUNITIES OF 1,000 - 2,500
BY PERCENT OWNER OCCUPIED, CONDITION, AVERAGE MONTHLY RENT AND VALUE

Un = Unincorporated Village V = Incorporated Village

Community	Number	Owner Occupied as % of all occ.	% with Private Bath & Toilet	Average Contract Monthly Rent	Average Value Owner Occupied One-Family Structure
Bayport Un	556	86.1	96.5	$-	$11,520
Bellport V	640	78.5	98.1	-	10,914
Blue Point Un	639	83.1	96.0	-	9,846
Brightwaters V	720	92.9	98.6	-	16,880
C. Moriches Un	685	74.4	79.6	34.97	8,123
East Hampton V	1,029	68.8	98.5	51.15	12,137
Eastport-Speonk Un	374	64.0	83.3	-	8,398
Greenlawn Un	292	82.8	99.0	-	13,585
Hagerman-North Bellport Un	861	76.4	89.4	-	8,129
TOWNS OF SUFFOLK COUNTY					
Babylon	16,504	78.4	92.8	47.98	9,448
Brookhaven	27,619	76.3	76.6	42.31	8,916
East Hampton	3,789	72.3	86.9	39.33	8,680
Huntington	15,317	76.8	94.0	54.71	12,290
Islip	19,109	77.6	87.1	47.42	10,487
Riverhead	4,060	65.7	79.1	39.73	10,323
Shelter Island	865	77.7	84.1	32.68	8.564
Smithtown	5,329	77.0	81.5	47.21	9,534
Southampton	9,506	68.3	85.9	40.41	9,995
Southold	6,229	68.6	84.7	32.24	9,330

Source: U. S. Census, 1950

The area around Huntington is rapidly approaching the medians of eastern Nassau County, and within the next five years the line of separation will probably move eastward to the western edge of Brookhaven. To date, the lack of building controls and restrictions that are present in Nassau County has permitted the development of large residential tracts, many of which leave something to be desired, as far as sound community planning is concerned.

The detailed picture of the population distribution and growth for the years 1950 through 1956 was included under Nassau County, Tables 6 through 34, as a part of the Long Island Lighting Company Report. See footnote No. 2.

While the graph in Figure 6 shows a slower rate of population increase for Suffolk County than Nassau County, it can be expected that the rate of growth in Suffolk will accelerate as space and accommodations become more scarce in Nassau, a condition now evident in the western towns of the county. The improvement in transportation will also accelerate this rate of growth.

SOCIAL AND ECONOMIC CHARACTERISTICS

Industry-Commerce

While the industrial growth of Suffolk has not been as pronounced as that of Nassau County, we again find that the aviation industry has played an important role. As aforesaid, the location of Farmingdale at the western edge of Suffolk County, and the Grumman plant at the eastern end of Nassau County have contributed to the development of both counties. Of the

fourteen hundred plants in the two counties--Table 38--approximately 510 are located in Suffolk County; they fall into the following categories:

Food industry	55	Primary metals	5
Textile industry	14	Fab-metals	45
Apparel industry	89	Machines (excl. elect)	35
Lumber industry	20	Electrical machinery	35
Furniture industry	15	Transportation equipment (mainly aviation)	50
Paper industry	5		
Printing and publishing	45	Instruments	20
Leather industry	5	Chemicals	15
Stone and clay	25	Miscellaneous	32

As we can see, there is the nucleus of an industrial complex upon which the industrial growth of Suffolk County can be built, although here, as in Nassau County, there is a large percentage tied up in the rather unstable aviation industry. On Long Island this industry is primarily shaped toward the production of military aircraft and the ever-fluctuating requirements of our national defense.

The data in Tables 63 through 66 give the breakdowns of employment, payrolls, and retail and wholesale trade for the years indicated, as published by the New York State Department of Commerce. The statistics are based on the same assumptions as those for the comparable data under Nassau County, Tables 35 through 37. See footnote No. 3.

From these figures we see that, as in Nassau County, the two predominant fields of employment in Suffolk County are (based on worker residence) manufacturing, and the wholesale and retail trades, with professional services and construction following. Tables 66 and 67 contain

the breakdown based on the location of the employer's establishment. Note that this basis for comparison provides the same relative standing with respect to the leading sources of employment.

In a detailed community breakdown of employment groups, the figures for professional services in Brentwood, Central and East Islip, East Northport, Northport, and Kings Park are much higher than the area averages. This is due to the location of large state hospitals in these areas; professional services include the staffs of these institutions.

While we have pointed out that the county is one of the leading agricultural areas in the country, the rather low percentages of total employment in this field does not seem to bear this out; however, most of the farms are seasonal in employment and, with the advances that have been made in farm equipment, require fewer employees. There are approximately 2,300 farmers and farm managers who augment their labor force by the use of 5,000 seasonal farm hands, a good many of whom are not permanent residents.

There are over twelve thousand persons who commute to work daily to other areas, primarily to Nassau County and New York City. A recent sample poll of commuters indicated that over eighty percent of these people would rather work nearer their homes in Suffolk if local employment for their skills were available. The comments previously made with respect to the balance of industry in Nassau County hold true for Suffolk County as well.

TABLE 63

SUFFOLK COUNTY DISTRIBUTION OF EMPLOYMENT BY TYPE AS COMPARED WITH THE TOTAL NASSAU-SUFFOLK AREA, MARCH 1948

Employment	Nassau and Suffolk Total	Suffolk County
Manufacturing Total	37,607	5,782
Ordnance	0	0
Food and kindred products	702	379
Tobacco manufactures	-	-
Textile mill products	1,608	955
Apparel and related	3,297	1,077
Lumber products (except furniture)	514	284
Furniture and fixtures	495	189
Paper and allied products	-	-
Printing and publishing	4,766	311
Chemical and allied	259	112
Petroleum and coal products	-	-
Rubber products	0	0
Leather and related	390	93
Stone, clay and glass	881	453
Primary metals	-	-
Fabricated metals	2,092*	491*
Machinery (except electric)	1,227	167
Electrical machinery	359	18
Transportation equipment	12,430*	468*
Instruments and related	6,781	269
Miscellaneous manufacture	1,386	348
Retail	23,904	5,907
Wholesale	6,648	2,153
Construction	11,796	2,940
Finance, insurance, real estate	5,468	1,341
Transportation, communication, public utility	11,477	2,428
Service	14,626	4,779

Where no figure is given, none is available.
*Total incomplete, data withheld to avoid disclosure.
Source: New York State Department of Commerce

TABLE 64

DISTRIBUTION OF ESTABLISHMENTS AND SALES OR RECEIPTS - SUFFOLK COUNTY AS COMPARED WITH TOTAL NASSAU-SUFFOLK DISTRICT, YEARS SHOWN

Type	Nassau and Suffolk	Suffolk County
Manufacturing, 1947		
Establishments	800	517
Total employees	38,938	13,213
Total wages and salaries ($000)	114,594	36,326
Value added manufacturing ($000)	164,267	49,115
Retail, 1948		
Establishments	11,295	3,997
Retail sales ($000)	859,786	255,851
Wholesale, 1948		
Establishments	589	238
Retail sales ($000)	317,133	90,736
Selected Service Trades, 1948 Establishments		
Personal services	2,029	605
Business services	162	32
Automotive repair, services	476	197
Receipts ($000)		
Personal services	28,896	6,796
Business services	3,644	243
Automotive repair, services	8,905	3,237
Hotels, 1948		
Establishments	157	104
Receipts ($000)	9,266	4,483

Source: New York State Department of Commerce

TABLE 65

SUFFOLK COUNTY DISTRIBUTION OF EMPLOYED PERSONS FOR COMMUNITIES OVER 2500 - BY TYPE OF EMPLOYMENT AS A PERCENTAGE OF TOTAL FOR YEAR 1950

County and Community	Number Employed	Percentage of Employed Persons				
		Agriculture Forestry & Fisheries	Mining	Construction	Manufacturing	Trans. Comm. Util.
SUFFOLK COUNTY	93,554	8.2	0.1	12.5	18.3	7.8
Amityville	2,303	0.8	0.0	8.0	21.7	6.1
Babylon	2,425	2.7	0.0	11.8	19.0	11.0
Bay Shore	4,021	3.0	0.0	10.0	14.7	14.2
Brentwood	1,120	2.3	0.0	12.4	16.0	5.7
Central Islip	1,240	1.1	0.0	9.5	11.3	6.0
East Islip	1,208	2.1	0.1	12.3	19.5	9.4
E. Northport	1,465	3.3	0.3	13.6	19.3	9.5
E. Patchogue	1,575	5.6	0.0	12.4	22.2	7.3
Greenport	1,111	18.0	0.0	7.9	11.6	8.0
Huntington	3,739	2.2	0.1	11.4	19.5	6.8
Huntington Station	3,798	2.2	0.1	19.1	24.5	7.5
Islip	2,155	4.3	0.0	11.5	19.5	9.2
Kings Park	1,438	1.1	0.0	3.1	2.6	1.9
Lindenhurst	3.444	1.9	0.1	11.0	34.8	10.5
Northport	1,457	1.1	2.1	10.0	16.0	10.0
Patchogue	2,917	2.8	0.0	9.0	22.0	8.0
Port Jefferson	1,197	4.9	0.2	13.2	17.0	12.8
Riverhead	1,940	9.1	0.1	8.8	8.4	11.6
Sayville	1,625	6.0	0.0	9.3	19.7	9.2
Southampton	1,595	12.1	0.0	13.5	4.0	6.5

Figures given are based on workers' residence

TABLE 65 continued

SUFFOLK COUNTY DISTRIBUTION OF EMPLOYED PERSONS FOR COMMUNITIES OVER 2500 - BY TYPE OF EMPLOYMENT AS A PERCENTAGE OF TOTAL FOR YEAR 1950

County and Community	Percentage of Employed Persons					
	Wholesale Retail Trade	Finance Insur. Real Est.	Business Repair Service	Personal Services	Entertainment and recreation	Professional Services
SUFFOLK COUNTY	17.8	4.0	3.1	6.4	1.1	16.4
Amityville	20.1	7.2	3.3	5.2	1.1	23.1
Babylon	19.3	6.3	2.7	6.2	1.2	12.6
Bay Shore	22.5	3.9	3.1	8.0	1.3	15.9
Brentwood	13.5	1.3	2.3	2.4	0.8	40.6
Central Islip	10.9	2.3	1.5	4.4	0.7	49.3
East Islip	18.1	4.7	2.4	6.5	1.2	19.0
E. Northport	14.1	4.9	3.4	4.8	1.4	22.5
E. Patchogue	23.7	3.4	3.5	5.3	0.7	10.3
Greenport	26.1	2.3	1.5	9.1	1.2	11.3
Huntington	22.9	5.4	3.5	8.4	1.4	15.6
Huntington Station	21.4	3.8	3.4	6.2	0.8	8.6
Islip	15.2	5.0	2.5	8.2	1.4	18.3
Kings Park	8.3	1.2	0.4	3.3	0.6	75.5
Lindenhurst	18.9	4.2	3.5	3.7	1.2	5.9
Northport	17.4	6.3	3.1	6.0	1.0	22.4
Patchogue	25.8	3.4	3.6	8.3	1.5	9.7
Port Jefferson	18.7	3.1	3.5	6.9	2.0	13.5
Riverhead	28.0	5.0	3.0	7.0	1.1	11.2
Sayville	20.2	6.1	2.6	5.9	1.3	14.1
Southampton	22.3	2.6	4.2	14.4	2.2	15.5

Figures given are based on workers' residence.

Source: U. S. Census, 1950

TABLE 66

DISTRIBUTION OF MANUFACTURING EMPLOYMENT COVERED BY UNEMPLOYMENT INSURANCE LAW - SEPTEMBER 1952

SUFFOLK COUNTY AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Type	Nassau and Suffolk	Suffolk	% of District Total
TOTAL	87,885	13,105	14.7
Ordnance and accessories	0	0	
Food and food products	1,280	559	
Tobacco manufactures	101	101	
Textile mill products	1,111	678	61.0
Apparel, cloth products	5,171	2,428	47.0
Lumber and products	649	139	
Furniture and fixtures	959	233	
Paper and paper products	658	31	
Printing and publishing	5,478	491	9.0
Chemical products	865	284	
Petroleum and coal products	54	0	
Rubber products	115	0	
Leather products	393	74	
Stone, clay, glass	928	129	
Primary metals	471	50	
Fabricated metal products	3,798	823	21.7
Machinery (except elect.)	2,169	555	25.6
Electrical machinery	2,170	874	40.3
Transportation equipment	39,997	4,090	10.0
Instruments and photo goods	18,492	976	5.3
Miscellaneous	3,026	590	19.0

Percentages shown only major categories.

Source: New York State Department of Commerce

TABLE 67

DISTRIBUTION OF EMPLOYMENT COVERED BY OLD-AGE AND SURVIVORS INSURANCE LAW, MARCH 1951
SUFFOLK COUNTY AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Type	Nassau and Suffolk	Suffolk	
TOTAL	155,783	35,111	22.5
Manufacturing	49,834	9,145	18.0
Mining	387	31	8.0
Contract construction	19,311	4,370	22.6
Public utilities	15,185	3,098	20.5
Wholesale trade	6,657	1,952	29.4
Retail trade	38,189	9,350	24.6
Finance, insurance and real estate	6,868	1,631	23.8
Services	16,305	4,505	27.6
Miscellaneous	3,047	1,029	33.7

Source: New York State Department of Commerce

The reader is referred to Tables 42 through 45 which provide additional data supplied the writers by the Research Section of The New York State Department of Commerce. Particular attention is called to the general comments preceding this data.

Income

The data in Table 68 present the breakdown of income groups by families only for the year 1949, based on a twenty percent sample published in the 1950 census, Suffolk County.

Comparing the data in this table with the same table for Nassau County, Table 46, we find that the median income in Suffolk County is only $3,411, which is $1,113 less than that in Nassau County. Further comparison shows that while the greater number of income-earning families in Nassau County are in the range from $3,000 to $7,000, the majority of the Suffolk group lies in the range from $3,999 to under $2,000.

Combining this comparison with the relationships between the two counties as regards employment, rentals, and home values, it becomes apparent that the over-all cost of living index in Suffolk County is below that of Nassau County. This is not difficult to explain when one considers that Suffolk County is still primarily rural in nature, while Nassau County is at the peak, or close to it, of what has been a rapid change from a rural area to one with a definitely urban complex. The demand for land in Nassau County has naturally inflated values; the resulting speculation, combined with the higher levels of income and employment, have raised the standards.

However, the western towns of Suffolk have already experienced the boom of building that is today moving eastward across the county; in these areas the income levels as along with other comparable factors, show that they are now undergoing the changes in character that occurred in Nassau County during the last ten years.

TABLE 68

SUFFOLK COUNTY INCOME IN 1949 OF FAMILIES ONLY
COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Group	Nassau and Suffolk	Suffolk
Total number of families	242,370	63,615
Number reporting	221,405	58,700
Median income $	4,230	3,411
PERCENTAGE GROUPS	FIGURES ARE THE PERCENTAGES OF THE TOTAL	
Less than $2,000	12.9	19.6
$2,000 - $2,999	13.1	19.6
$3,000 - $3,999	19.7	22.1
$4,000 - $4,999	15.4	13.6
$5,000 - $6,999	19.4	14.7
$7,000 - $9,999	9.8	6.0
$10,000 and over	9.6	4.3

Source: New York State Department of Commerce

Note that the percentages for the groups above $4,000 are lower in Suffolk than the state averages for those categories.

New York State figures for these groups are as follows:

$4,000 - $4,999 ..... 13.9
$5,000 - $6,999 ..... 15.2
$7,000 - $9,999 ..... 6.7
$10,000 and over 4.8

While these percentages for Suffolk are slightly lower than the state averages, they are not sufficiently different to enable us to draw any conclusion with regard to Suffolk versus the rest of the state. Undoubtedly, the growth in population and industry over the past five years will cause some increases by the next census.

Table 69 contains the breakdown of income groups by families and unrelated individuals for 1949, as published by the 1950 census. These figures do not change the above comparisons.

Table 70 contains the breakdown of income payments to individuals for the year 1952, as reported by the New York State Department of Commerce. The income payments are based largely on reports by employers and thus represent income received by persons working in each county. See footnote No. 5.

Note that while the percentage of income earned under Wages and Salaries for Suffolk County is lower than the state average of 70.7, the percentages of Proprietor's and Property income are above the state averages of 10.1 and 13.6 respectively. This is the reverse of the situation found to exist in Nassau County.

The per capita income in Suffolk County is shown as some $321 below the state average for 1952; however, any attempt to compare per capita incomes is complicated by the fact that upward revisions were made in the population estimates used for the 1952 figures and included in the personal income data given in Table 49, which contains the income data for the year 1954. The differences between the per capita income in 1952 and that for 1954 do not represent a change in income levels.

The reader is referred to Table 50, which contains the combined Nassau-Suffolk County data for average employee earnings and hours for the industrial worker. This table shows the latest available comparative figures on income for the area.

The data in Table 71 indicates the farm situation in both Nassau

TABLE 69

SUFFOLK COUNTY INCOME IN 1949 OF FAMILIES AND UNRELATED INDIVIDUALS AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Group	Nassau and Suffolk	Suffolk
Total number	288,930	78,840
Number reporting	262,290	72,380
Median income $	3,831	3,113
PERCENTAGE GROUPS	FIGURES ARE THE PERCENTAGES OF TOTAL	
Less than $2,000	21.3	28.3
$2,000 - $2,999	13.4	19.0
$3,000 - $3,999	18.0	19.9
$4,000 - $4,999	13.6	11.7
$5,000 - $6,999	16.9	12.4
$7,000 - $9,999	8.4	5.0
$10,000 and over	8.3	3.7

Source: New York State Department of Commerce

The inclusion of the unrelated families in the compilation reduces the median income in the same manner as was already seen for Nassau.

TABLE 70

SUFFOLK COUNTY INCOME PAYMENTS TO INDIVIDUALS - 1952
AS COMPARED WITH NASSAU-SUFFOLK DISTRICT TOTALS

Group	Nassau and Suffolk	Suffolk
TOTAL ($000,000)	1,551.3	375.1
Percentage Earned of Total		
By Group		
Wages and salaries	67.6	60.6
Proprietor's income	9.4	13.9
Property income	18.1	19.5
Other income payments	4.8	6.0
By Residence of Recipient		
Total ($000,000)	2,258.8	500.3
Per capita	2,169	1,687
Motor Vehicle Registrations 1953		
Passenger cars	448,691	131,887
Other	86,653	35,269
BANK DEPOSITS June 30, 1952 ($000,000)	820	260

Source: New York State Department of Commerce

TABLE 71

NASSAU AND SUFFOLK COUNTY FARMS IN 1950 COMPARED AS TO NUMBER, SIZE, VALUE, AND PRODUCE

Group	Nassau	Suffolk
Number		
All farms	618	2,187
Dairy farms	27	103
Average Size (acres)	44.2	56.4
Land and Buildings Value per Farm - $	85,453	40,650
Percentage Reporting Electricity	71.2	92.7
SALES OF FARM PRODUCTS IN 1949		
Total		
($000)	9,919	33,136
Per farm - $	17,494	16,015
Dairy Products ($000)	726	1,776
Poultry and Products ($000)	1,080	12,022
Other Livestock ($000)	93	408
All Crops ($000)	8,019	18,921
Forest Products ($000)	1	9

Source: New York State Department of Commerce

These figures structure the farm situation as shown in the 1950 census. Undoubtedly, the increasing rate of urban growth in Nassau will greatly reduce the remaining farms by the time of the 1960 census. This will increase the demand in Suffolk and tend to increase values and production there.

and Suffolk Counties for the year 1950, as provided by the New York State Department of Commerce. The high value per farm shown for Nassau County is due to the large number of farms in that county that are operated as part of estates owned by gentlemen farmers, and to the fact that land values in Nassau County are higher than they are in Suffolk County.

Housing

The data in Table 72 bear out the fact that the residential growth in Suffolk County had not, as of 1950, felt the effects of the boom in Nassau County. The rate of construction for residential units remained fairly constant from sometime prior to 1919 up through 1950. Also note that the units are for the most part single-family type with a very small number of multiple dwellings confined to the larger communities.

Table 73 structures the dwelling units shown in the previous table as to characteristics of accommodations, heating, fuel, and cooking media. The basis for these tables is the same as Tables 51 and 52. These statistics substantiate the conclusion that the characteristic of the county, as reflected by the dwelling units, was primarily rural prior to 1950. While no detailed data are available to compare these factors over the last five years, tabulations of building activity, presented under the summary for Suffolk County show the accelerated building growth that has occurred in dertain areas. This growth trend has already been indicated in the discussion of previous factors.

Transportation

The previous discussion of transportation under Nassau County

TABLE 72

SUFFOLK COUNTY DWELLING UNITS - 1950, BY NUMBER, YEAR BUILT, AND TYPE OF STRUCTURE AS COMPARED WITH THE NASSAU-SUFFOLK DISTRICT

Group	Nassau and Suffolk	Suffolk
Total Number	315,103	108,402
Occupied		
Number	260,158	71,529
Percent owner occupied	75.5	75.6
Seasonal and Nonresidential	37,913	30,360
Percentage Distribution by Year Built		
1940 or later	34.5	27.1
1930 - 1939	21.5	25.7
1920 - 1929	25.2	20.5
1919 or earlier	18.8	26.7
Percentage Distribution by Type of Structure		
One-family detached	82.7	89.6
Two-family	9.9	7.0
Three to nine-family	4.2	2.8
Ten-family or more	3.2	0.5

Source: New York State Department of Commerce

TABLE 73

SUFFOLK COUNTY DWELLING UNITS 1950, BY CONDITION AND FUEL USED AS COMPARED TO NASSAU-SUFFOLK DISTRICT

Group	Nassau and Suffolk	Suffolk
Percentage of Dwelling Units Reporting		
Total Number Reporting	235,735	57,680
Private bath and toilet Hot running water Not dilapidated	85.1	80.0
Mechanical refrigerator	95.1	90.6
Central heating	91.5	82.1
Percentage Using Specified Fuel		
Coal	23.0	35.0
Gas	8.5	5.5
Liquid	66.3	59.5
Other	2.1	2.0
Percentage Using Specified Cooking Fuel		
Gas	77.1	72.7
Electricity	10.0	9.6
Other	12.9	17.7

Source: New York State Department of Commerce

The Suffolk County average for units with bath and toilet is above the state figure of 83.5 percent. Except for individual or isolated cases, there are no slum areas as such in Suffolk.

included the pertinent points for Suffolk County (See Figures 8 and 9), inasmuch as the transportation problems and factors are common to both. The only additional comment that might be made at this point is that the local traffic pressures in Suffolk County have not yet built up the congestion to the same level as that of Nassau County, nor does this county have as serious a situation to face in the immediate future, but it should take heed of the lesson to be learned from its neighbor and plan now to prevent the occurrence of the same problems.

Health and Welfare

Water Supply

In Suffolk County, the daily water demand of approximately thirty million gallons is supplied from twenty public systems, 52 private systems, about 180,000 private wells, and innumerable individual roof catchment and cistern combinations. The twenty public services, of which eleven are combined under the Suffolk Water Authority, supply approximately 46% of the population. The 52 private companies supply about 9%, and the remainint 45% depend on their own wells or catchment.

The general comments on the water supply and sources made under the discussion of Nassau County apply also to Suffolk. Up to the present time, Suffolk has drawn its water from a stratum above that used by Nassau, and the concentrations of draw-down have been insufficient to cause any great problem. There are no figures available as to the estimated ultimate capacity of the ground water under the county. However, storm water recharge basins are beginning to appear, especially along the new highways. Suffolk County planners might well reserve additional catchment areas for

this purpose before the real estate developer gets there first. While there are vast areas of vacant land in the county, if the present rate of buildup continues or increases, Suffolk County may face the same situation that now prevails in Nassau County.

Sanitation

See the discussion under Nassau County.

Medical

See the discussion under Nassau County and Table 53.

Parks

See the discussion under Nassau County.

Education

See the discussion under Nassau County and Tables 54, 55, and 56.

SUFFOLK

General

This discussion of Suffolk County has provided the details behind the factors that govern the community structure and its development and growth. Because of the elements involved, the structure of the county is not constant across its face, as is nearly the case with Nassau County: rather, Suffolk County varies from an urbanized community at the western end to an almost purely agricultural community at the eastern end. During the summer months, the unused woodlands and shores of eastern Suffolk are popular as a vacation playground.

The urbanization of the western portion of the county has occurred in the years since World War II with the pressures from metropolitan New York and the overflow from Nassau County. While the rapid growth in the western end of the county is creating a wave or boom that is moving eastward every year, there is little present danger that the area will become saturated. The Regional Plan Association estimates that as of 1954, the developed residential area in square miles for all of Suffolk County was only 66, with a density of 9 persons per gross residential acre. This further predicted that by 1975 the density will be 8 persons per gross residential acre spread over a total of 141 square miles of developed residential area; this represents an increased development of some seventy-five square miles of residential land. However, consider that the total area of the county is over nine-hundred square miles. This is a different situation by far from that found in Nassau County, where near-saturation will soon be reached.

In gathering information on current building activity in the various communities, the writers are indebted to the Long Island Lighting Company for the data upon which Table 74 is based. These tables show the active residential electric meter counts for the townships and for areas within them covering the years 1950, 1952, 1954, and 1956. The districts and years are the same as those used in the population report included earlier in this study, see Figure 5, for the key map indexing the areas and districts by name and number. Only the two western townships of Huntington and Babylon are broken down into smaller segments; however, with the exception of Brookhaven, the individual areas of the remaining townships are

considered sufficiently small. The unincorporated portion of Brookhaven has been divided into a northern and a southern part with State Highway Route 25 as the approximate dividing line.

Considering that the active meter count represents the number of occupied dwelling units, reasonable figures for the estimated rate of residential building activity may be obtained by taking the difference between any two years; these figures are shown as the increase per period. Comparing these values, as shown in the table containing the Suffolk County Summation, the rate of over-all growth has remained fairly constant. However, taking the detailed figures for the western townships and comparing them with those in the eastern townships, the rate in the western areas has dropped off in the last two years, while the rate in the townships about half-way between, for instance Smithtown and Islip, has accelerated slightly. At the same time, the rate for the eastern townships has remained nearly constant. From this comparison, there comes substantiation for the statements that have been made as to the existence of the eastward movement of the building wave. The crest of this wave is now estimated by some to have reached into Brookhaven, and visual inspection of activity in that area around Centereach and Selden indicates that this might well be the case, but available data place the crest in Smithtown Township.

In order to substantiate further the existence and movement of this building boom, efforts were made to gather data on some other basis. In Suffolk County this is impossible because of the various regulations under which the different towns operate. Table 75 contains the available

TABLE 74

SUFFOLK COUNTY

ACTIVE RESIDENTIAL ELECTRIC METERS IN LILCO SURVEY DISTRICTS
YEARS 1950, 1952, 1954, and 1956
METER COUNT

	1950	1952	1954	1956
HUNTINGTON TOWNSHIP				
Huntington Area - DISTRICT 21				
Incorporated Places				
Loyd Harbor	230	268	351	430
Huntington Bay	308	348	383	400
Total	538	616	734	830
Unincorporated Area	8,355	9,942	12,280	14,852
TOTAL DISTRICT	8,893	10,558	13,014	15,682
Increases Per Period		1,665	2,456	2,668
HUNTINGTON TOWNSHIP				
Northport Area - DISTRICT 22				
Incorporated Places				
Northport	1,276	1,373	1,462	1,509
Asharoken	92	105	115	127
Total	1,368	1,478	1,577	1,636
Unincorporated Area	3,428	4,020	5,127	7,633
TOTAL DISTRICT	4,796	5,498	6,704	9,269
Increases Per Period		702	1,206	2,565

Source: LILCO

TABLE 74 continued

	1950	1952	1954	1956
HUNTINGTON TOWNSHIP				
South Huntington Area - DISTRICT 23				
Unincorporated Area (all)				
TOTAL DISTRICT	745	840	1,013	1,343
Increase Per Period		95	173	330
HUNTINGTON TOWNSHIP SUMMATION				
TOTAL TOWNSHIP	14,507	16,896	20,731	26,294
Increase Per Period		2,389	3,835	5,563
BABYLON TOWNSHIP				
North Babylon Area - DISTRICT 24				
Unincorporated Area (all)				
TOTAL DISTRICT	2,688	3,715	4,525	4,664
Increase Per Period		1,027	810	139
BABYLON TOWNSHIP				
Amityville-Lindenhurst Area - DISTRICT 25				
Incorporated Places				
Amityville	1,662	1,831	1,976	2,128
Lindenhurst	2,729	3,458	4,370	4,682
Total	4,391	5,289	6,346	6,810
Unincorporated Places				
North Amityville	1,860	2,676	3,215	3,786
Copiague Area				
TOTAL DISTRICT	6,215	7,965	9,561	10,596
Increases Per Period		1,750	1,596	1,035

continued

TABLE 74 continued

	1950	1952	1954	1956
BABYLON TOWNSHIP				
Babylon Area - DISTRICT 26				
Incorporated Places				
Babylon	1,890	2,262	2,458	2,765
Unincorporated Places				
South Babylon	3,613	5,792	8,195	11,035
TOTAL DISTRICT	5,503	8,054	10,653	13,800
Increase Per Period		2,551	2,599	3,147
BABYLON TOWNSHIP SUMMATION				
TOTAL TOWNSHIP	14,442	19,734	24,739	29,060
Increase Per Period		5,292	5,005	4,321
SMITHTOWN TOWNSHIP - DISTRICT 27				
Incorporated Places				
Village of the Branch	52	50	52	143
Head of the Harbor	129	135	152	159
Nissequogue	79	79	98	117
Total	260	264	302	419
Unincorporated Area	4,171	4,727	5,425	6,675
TOTAL DISTRICT	4,431	4,991	5,727	7,094
Increases Per Period		560	736	1,376

continued

TABLE 74 continued

	1950	1952	1954	1956
ISLIP TOWNSHIP - DISTRICT 28				
Incorporated Places				
Brightwaters	724	761	837	883
Ocean Beach	388	441	475	468
Saltaire	90	98	97	89
Total	1,202	1,300	1,409	1,440
Unincorporated Area	15,070	18,016	22,924	30,116
TOTAL DISTRICT	16,272	19,316	24,333	31,556
Increases Per Period		3,044	5,017	7,223
BROOKHAVEN TOWNSHIP - DISTRICT 29				
Incorporated Places				
Oldfield	93	96	100	116
Belle Terre	70	77	77	84
Porquott	115	123	151	163
Shoreham	52	60	62	68
Patchogue	2,184	2,468	2,607	2,706
Bellport	529	598	630	709
Total	3,043	3,422	3,627	3,846
*Unincorporated Area	20,045	22,774	26,740	31,480
TOTAL DISTRICT	23,088	26,196	30,367	35,326
Increases Per Period		3,108	4,171	4,959
*North of Route 25;	10,063	11,485	13,688	16,359
South of Route 25;	9,982	11,289	13,052	15,121

continued

TABLE 74 continued

	1950	1952	1954	1956
RIVERHEAD TOWNSHIP - DISTRICT 30				
TOTAL DISTRICT (Unincorporated)	3,108	3,514	3,859	4,279
Increases Per Period	406	345	420	
TOWNSHIP OF SOUTHAMPTON - DISTRICT 31				
Incorporated Places				
North Haven	78	111	132	182
Sag Harbor*	792	860	901	944
Southampton	1,334	1,399	1,493	1,561
Quogue	360	394	407	415
Westampton Beach	482	546	678	754
Total	3,046	3,310	3,611	3,856
Unincorporated Area	4,847	5,707	5,831	7,470
TOTAL DISTRICT	7,893	9,017	9,442	11,326
Increases Per Period	1,124	425	1,884	
TOWNSHIP OF SOUTHOLD - DISTRICT 32				
Incorporated Places				
Greenport	1,035	1,041	1,072	1,183
Unincorporated Area	3,618	3,997	4,490	4,943
TOTAL DISTRICT	4,653	5,038	5,562	6,126
Increases Per Period	385	524	564	

* Part in the Town of East Hampton.

continued

TABLE 74 continued

	1950	1952	1954	1956
TOWNSHIP OF EAST HAMPTON - DISTRICT 33				
Incorporated Places East Hampton	711	772	894	935
Unincorporated Area	1,467	1,706	2,354	2,736
TOTAL DISTRICT	2,178	2,478	3,248	3,671
Increases Per Period		300	770	423
TOWNSHIP OF SHELTER ISLAND - DISTRICT 34				
TOTAL DISTRICT	391	400	410	420
Increases Per Period		9	10	10
SUFFOLK COUNTY SUMMATION				
TOWNSHIPS				
Huntington	14,507	16,896	20,731	26,294
Babylon	14,442	19,734	24,739	29,060
Smithtown	4,431	4,991	5,727	7,094
Islip	16,272	19,316	24,333	31,556
Brookhaven	23,088	26,196	30,367	35,326
Riverhead	3,108	3,514	3,859	4,279
Southampton	7,893	9,017	9,442	11,326
Southold	4,653	5,038	5,562	6,126
East Hampton	2,178	2,478	3,248	3,671
Shelter Island	391	400	410	420
TOTAL COUNTY	90,963	107,580	128,418	155,152
TOTAL INCREASES		16,617	20,838	26,734

data on residential building activity, based on building permit authorizations, as reported to the state by the different towns; however, certain of the eastern towns do not report data, and these figures are lacking in any comparison. Further, unlike Nassau County, there are no available data on the units actually constructed and occupied. In Nassau County, where occupancy certificates are required, a ready source of count is available, but in Suffolk County there are either no certificates or no reports on them. One of the difficulties to be guarded against when using building authorizations for comparisons is that a fair proportion of all the building permits issued are granted to speculative realtors and may or may not be used. An example of this is contained in the breakdown of permits issued in Brookhaven during 1954. The total for the year is higher than is reasonable; a check of the possible reasons showed that the area had been upzoned during the year, and that many of the promoters had rushed in to file permits under the old, less strict regulations. Local comment was to the effect that a goodly portion would not be built but were for speculation. Another problem in using the building permit as a basis, unless correlated against actual occupancy information, is the time it takes to construct the building. Many of the building permits run over a period of as long as four and five years before the dwelling is finished. This explains the variance between the summations obtained from the residential meter count and the building permit authorizations. There can be no doubt that the meter count is the more reliable of the two.

In Suffolk County there is no centralized authority or control for the regulation and planning of the area's development and growth. In the

TABLE 75

RESIDENTIAL BUILDING ACTIVITY AS DETERMINED FROM THE NUMBER OF DWELLING UNITS AUTHORIZED, SUFFOLK 1950 - 1955
BASED ON REPORTED BUILDING PERMITS

Community and Area	1950	1951	1952	1953	1954	1955
Amityville	112	47	71	151	92	51
Asharokan	8	7	7	2	4	6
Babylon	364	92	88	127	117	201
Babylon - Township	3,064	1,409	2,228	1,480	2,224	1,725
Belle Terre	2	2	2	2	-	6
Bellport	-	-	6	20	30	80
Brightwater	22	27	50	25	37	17
Brookhaven - Township	1,389	1,369	1,493	1,946	3,782	2,776
Head of Harbor	-	-	5	3	3	6
Huntington Bay	11	10	11	6	11	16
Huntington - Township	1,391	914	1,514	2,758	3,194	2,947
Islip - Township	1,858	1,944	2,442	2,981	3,610	4,085
Lindenhurst	484	188	780	159	186	186
Loyd Harbor	37	31	23	20	34	55
Nessequogue	1	1	3	7	8	1
Northport	37	55	31	28	34	24
Patchogue	60	27	51	57	23	52
Smithtown - Township	252	251	217	283	670	1,202
Southampton	19	30	16	30	27	34
(Multiple dwellings)	3	12	35	20	10	32

Only those townships reporting to the state are included.
The town of Riverhead has no building regulations.
Not all incorporated villages are included, due to incomplete data.

Source: State of New York - Division of Housing - Bureau of Research

western towns of Babylon and Huntington, where the urbanization is proceeding almost as rapidly as it is in the eastern parts of Nassau County, there exists the immediate need for coordinated planning and control. The need is not as immediate in the balance of the area, but if the people of Suffolk County are not careful, they will allow themselves to be lulled by the lack of urgent pressures and awaken too late to find their communities swelled beyond the point of no return. An indication of present patterns in the five townships with zoning regulations is shown by the land use analysis Table 76. There still exists room in these townships for the growth of business and industry within the zoning limits.

The Suffolk County Planning Board was established by the Board of Supervisors of the county in March, 1954. This group acts in an advisory capacity to the county and the towns within it, but it exercises no regulatory control. Prior to the establishment of this Board there were no base maps, population distribution maps, or land use analyses. Progress during the past two years has included the completion of most of the maps and basic tools required if the planning efforts are to be successful. It appears to the writers that at some time in the near future the Suffolk County Planning Board should be placed in the position of reviewing local regulations with the objective of standardizing regulations between towns in conformance with an over-all development scheme. The best of individual professional planning by separate townships will be of little ultimate value without adequate integration into the structure of the county as a whole; the day may yet come when most of Suffolk County is just one large urban complex.

TABLE 76

SUFFOLK COUNTY LAND USE ANALYSIS 1955

Use	Towns				
	Smithtown	Huntington	Babylon	Islip	Brookhaven
	Percentage of Acreage				
Residence	86.6	94.6	86.8	88.5	95.5
Zoned business	4.8	3.2	5.2	5.2	3.5
Used for business	2.7	1.3	2.8	3.4	1.5
Zoned industrial	8.6	2.2	8.0	6.3	1.0*
Used for industry	4.9	1.6	3.3	5.5	0.75*

* Does not include Brookhaven Laboratory

Note: Percentages as indicated include streets, railroads, and inland waterways, and have been computed by planimeter and scale with such accuracy as is necessary for planning purposes.

Source: Suffolk County Planning Board - 1955 Report

Included in the above are only those five towns with firm zoning. The towns of Riverhead, Southampton, Easthampton, Southold and Shelter Island have no zoning at this time.

PART III

THE INDUSTRY

EARLY GROWTH

The Wright brothers made man's first powered flight on 17 December 1903. In fifty-three years the airplane has accelerated from 30 miles per hour to speeds exceeding that of sound. Except for some early theoretical papers little progress had been made by 1910 in the study of aerodynamics, structures, materials, or methods. There were no books on the subject and no methods of a quantitative analysis of flight experience. Airplanes in the early days were the crude products of the bicycle shop, blacksmith, wood working shop, and garage.

The planes of 1910 with their open framework of struts supporting kite-like wings were a far cry from the jets of today. Improvement came early, however, and by World War I planes were developed to a fair degree of dependability. The Curtiss hydroaeroplane and the later famous NC flying boat were the pride of the Navy. By November 1918 there were 24 aircraft manufacturers employing 175,000 workers. Plants were equipped to build 21,000 planes a year, and the record of actual deliveries had reached 16,000 planes and 25,000 motors.[1]

Demobilization after the armistice was rapid and followed the sentiments of the slogan, "The war is over. Let's get out of it and forget it!" Plane contracts were canceled, surplus planes were sold. As far as the airplane was concerned, it had played a spectacular, but not too convincingly practical role.

Considering the fact that aviation was geared to military requirements, this immediately had a depressive effect on the industry. Total

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[1] A. D. Turnbull and C. L. Lord, "History of United States Naval Aviation," Yale University Press, 1949, p. 147.

planes produced in 1920 were 328 units.

FIRST ALL METAL PLANE

Prior to 1920 there had never been an all-metal plane built in the United States. Germany had the metal Junker bomber during World War I but, except for the few news photos then available, only a few people had actually seen it. The first such American plane was built for the Navy in 1922.

The manufacturer knew little about the structural problems of an internally trussed wing and even less about the aluminum alloy of which the wing was made. The Aluminum Company of America, which had just started production, had ideas about what could be expected of the metal but wasn't too positive. Nevertheless, the plane flew successfully carrying a 2,000 pound torpedo. It cost $200,000.[2]

EARLY INDUSTRY ADVANCES

Possibly the first regular commerical use of aircraft was the U.S. Air Mail Service which has been operated by the Post Office Department since 15 May 1918. By 1920 it had grown from an experimental hop between New York and Washington to a transcontinental run. In 1921 there were 44 pilots and 98 planes. Average speed for the year was 86.3 miles per hour, and ten pilots and twenty-seven planes were lost in crashes.[3] The government withdrew from actual flight operations in 1926 and has since

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[2] G. F. Prudden, "Adam Couldn't Fly," Mechanical Engineering, Vol. 75, No. 11, Nov. '53, p. 896.

[3] H. F. Reeve, "ASME Role in Powered Flight," Mechanical Engineering, Vol. 75, No. 12, Dec. '53, p. 987.

contracted for such service from commercial airlines.

The second all-metal plane was built about 1924. This time with the newly gained ability to heat-treat aluminum and a specially designed pneumatic rivet hammer, the cost of the plane was reduced 87.5% to $25,000.

Henry Ford purchased the old Wright Aeronautical Co. in 1925, and his name gave the airplane an industrial status which helped elevate the industry from its previous amateur standing. This plus Lindbergh's Atlantic flight in the "Spirit of St. Louis" on 20-21 May 1927 gave aviation the push it needed. Aircraft production increased 435% during the five-year period ending 1930 with a total of 3,437 units produced that year.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION

During the late '20's most aircraft companies were either dying or being swallowed up in mergers.[4] Two months after the stock market crash of '29 Grumman Aircraft Engineering Corporation was founded as a $64,325 investment. Called the oldest management team in aviation, Grumman has six top executives who have been with the firm since its inception.

ORIGINAL PLANT

Opened for business on 2 January 1930, the first plant at Baldwin, Long Island, consisted of a rented garage, one lathe, one drill press, one sanding machine, one bandsaw, one saw-joiner combination, one metal stretching hammer, and twenty-seven men.[5] Business consisted of repairing crashed

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[4]Governmental competitive-bid procedures are considered by many to have brought on these failures. Under competitive bidding the experienced companies lost out to inexperienced contractors who had bid too low, lost money, and went broke. In the meantime there were no contracts to keep the experienced companies in operation.

[5]"Grumman Aircraft Engineering Corp.-Bethpage and Calverton, L.I., N.Y., 1930-1955" (mimeographed) published by the company.

airplanes and building some aluminum truck bodies. Its first actual government contract was from the Navy for two pontoons with retractable wheels designed to convert the catapulted scouting planes into amphibians. On the satisfactory performance of the first job six more pontoons were ordered. Grumman ended its first year with a net profit of $5,476 on sales over $109,000.[6]

The second year an experimental fighter (retractable landing gear and watertight fuselage) was defeloped under contract to the Navy for $27,000. Not only was it operationally successful (it flew 20 mph faster than any other plane of its class), it was also the first experimental plane in history to show a profit. The resultant order for a squadron of twenty-seven FF-1's amounted to $641,950.

The second plane designed and produced by Grumman was a single-seat biplane fighter having a top speed of 250 miles per hour at 7,500 feet elevation. So well did the plane perform that fifty-four were ordered.

The company's earnings had reached $132,000 by 1936 and Navy orders included scout and attack planes, and amphibians, as well as the carrier based fighters. The plant had been moved twice - from Baldwin to Valley Stream, then to Farmingdale, where it was set up in a vacant Fairchild plant in November 1932.

EARLY PERSONNEL RELATIONS

Lots of things happened during the company's stay at Farmingdale that have helped to build the spirit of the company as it is today. Sandlot softball competition between office and shop was the start of what is

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[6] "Happy Days at Grumman" Fortune, Vol. XXXVII, No. 6, June 1948, p.112.

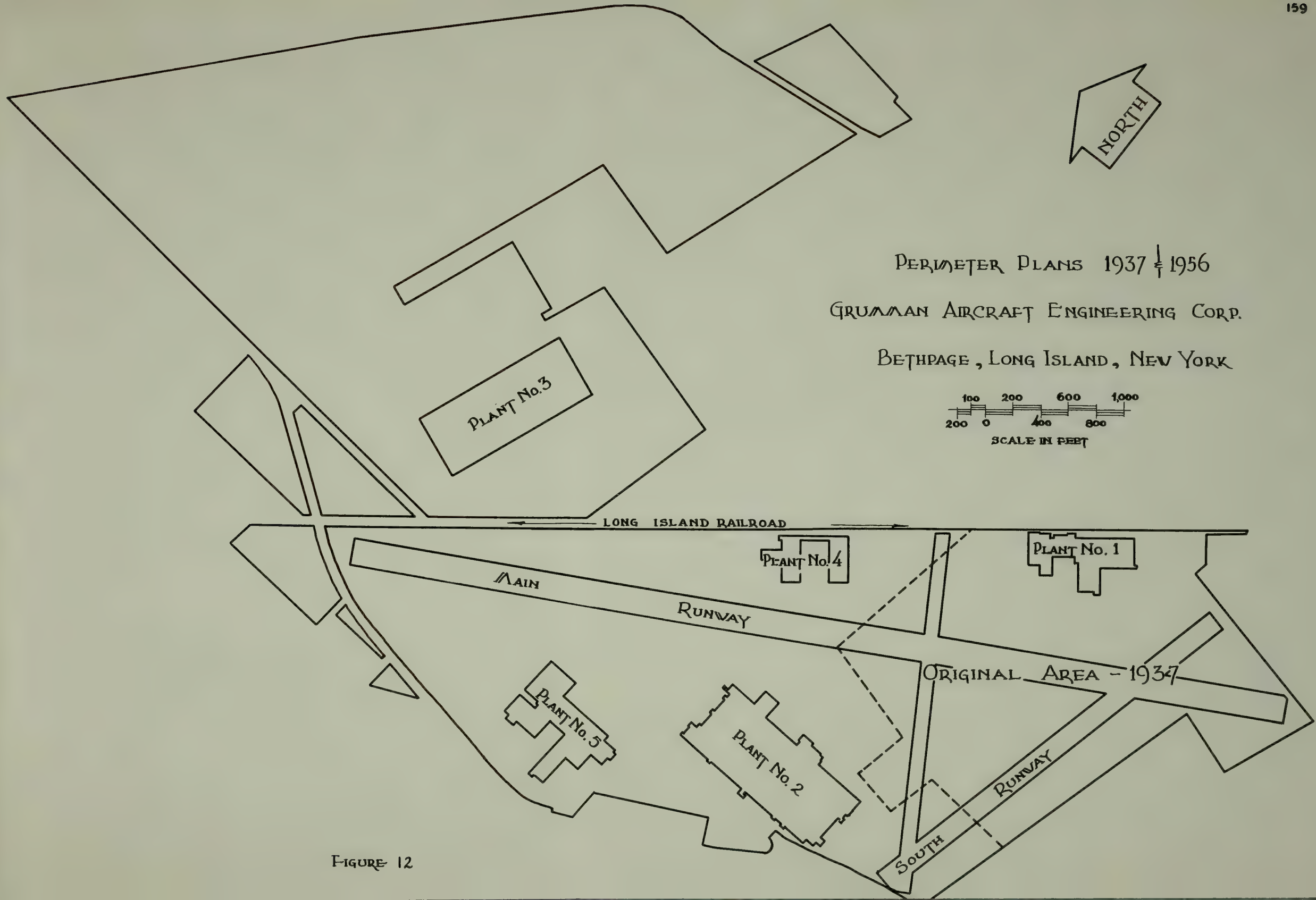
today an extensive sports program. The company established a policy of paying employees by check after the payroll robbery. And the deep roots of Grumman's outstanding management-employee relationship were set here. They still talk about the "Big Push" in 1935 when the Experimental Department, in order to meet a Navy deadline, built from scratch in 21 days, a new experimental F3F fighter to replace the original plane that had crashed in Virginia while being delivered. They had done their work so well that the company got the contract for 54 more units.

Even a hailstorm served to cement employee relations. In August 1935 a hailstorm knocked out all the windows in the large skylight which extended the length of the plant. Broken glass was everywhere, some heads were cut, and many drawings were ruined. Almost to a man the company turned out and spent the weekend puttying windows. The job wound up with a watermelon feast when someone discovered a railroad car of melons on a nearby siding.

BETHPAGE PLANT

Grumman moved to its present plant site at Bethpage in 1937. As indicated in Figure 12 the facilities consisted of 112 acres of turf flying field, a building of about 213,000 square feet, and a railroad siding of the Long Island Railroad Company. It was a complete and modern (by the standards of the day) plant adequate for peacetime production and cost $360,000. By this time the payroll had grown to approximately 400 pay checks.

The area was rural and geared to an agricultural economy. A few residential settlements were scattered in small pockets and followed no particular pattern. If there was any general tendency to gravitate toward the



PERIMETER PLANS 1937 & 1956

GRUMMAN AIRCRAFT ENGINEERING CORP.

BETHPAGE, LONG ISLAND, NEW YORK

100 200 600 1,000
200 0 400 800
SCALE IN FEET

FIGURE 12

railroad line, there seems to be little evidence that the railroad was at all responsive. Real estate values in the area averaged $300 to $500 per acre.

Grumman's first commercial order came at the same time as the move to Bethpage and from this developed the famous Gray Goose and Widgeon amphibian series. Oil companies, airlines, and mining operators, as well as the Army Air Corps placed some $3 million of orders in addition to the regular naval aircraft orders which had grown to $5 million by 1940.

WORLD WAR II

By this time Grumman was already in World War II and filling orders from South America, France, and Britain for its new 330 miles per hour Wildcat fighter. Employment which had increased to 700 by 1 January 1940 was pushed to more than 1,700 twelve months later. When the United States entered the war employment was up to 7,500 workers.

EXPANDING PRODUCTION

Plant facilities were operating at full capacity. Therefore, to meet the Navy's increasing production requirements, the first of a series of government financed plant expansions (see Facilities Expansion below) was begun in November 1940. The first, Plant No. 2, was in operation five months before the Japanese attacked Pearl Harbor.

In the first four months of 1942, 334 fighter planes were produced - more than the total output for the previous year. The total for 1942 was 2,280; 4,406 in 1943; and 6,329 in 1944. In 1945, with almost 4,000 less workers, planes came off the line at 525 per month (644 in March), plus

enough spare parts to build 160 more planes, making a total of 4,067 aircraft in the last eight months of the war. In 45 months of war production more than 17,000 planes had been built.

PERSONNEL RECRUITMENT AND MANAGEMENT

With production flowing like an open fire hydrant and employment multiplying faster than a herd of rabbits, the basic structure of the organization was heavily taxed to maintain its characteristic patterns. It was hopeless to even think of obtaining skilled technicians. More important was the need for bodies that could be trained. White collar workers who had only a smashed thumb acquaintance with a hammer came from all over Long Island. They were followed by women who were even less familiar with tools. All were assimilated into the organization with the typical personal touch. Realizing that necessity was often the cause of absenteeism (the curse of every production schedule), a "green wagon service" was put in operation. If a faucet had been left running in the kitchen; if the car broke down on the way to work; if automobile license plates were needed; or if the house had been left unlocked that morning, the "green wagon" took care of it. Throughout the war approximately 17,000 errands were run for workers who would otherwise have had to take time off from work to do them.

Approximately 30,000 inexpensive, hot meals were served daily in the air conditioned plant; nurseries were provided for the children of women workers; an employee orchestra played for dancing during lunch hours; and volley ball, handball. and baseball games were played during off hours. To parents of new babies went appropriately tinted record books. Everyone

got the customary free turkey for Christmas, and to insure delivery in 1944 Grumman bought the eggs and went into the turkey business.[7]

Having had an incentive compensation plan since 1930, Grumman devised a war production incentive plan in 1943 that gave each employee a share in the savings on all airframe production. Every worker at the end of each quarter received a bonus based upon his earnings for that quarter to which was applied a percentage factor equal to one half the percentage by which the output of the company exceeded par. It was the first such plan in the industry and possibly the simplest, inasmuch as individual operation time studies were eliminated and the bonus was paid on the output of the entire shop. In 1943 every employee from janitors up to and including $8,000 per year executives received a quarterly bonus amounting to 25 percent of their base pay. Under this plan a total of $38 million was added to the pay rolls by the end of the war. Inasmuch as the scheme was tailored to a maximum production condition, it was no longer needed after the government orders were reduced, and the plan was stopped V J Day.

Possibly one of the principal reasons why the employees have never sought union help in representing them before top management is the simple fact that everyone knows they can literally walk into the office of the Chairman of the Board or the President (both executives share the same office) and air their problems. In the words of the President, "They don't have to talk to a lot of monkeys along the line."[8]

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[7] "The Embattled Farmers," Time, Vol. XLIV, No. 11, 11 Sept. 1944, p.79.

[8] Ibid.

The following illustration is typical of Grumman's psychological approach to personnel management problems. During the war a foreman wanted to fire a group of shopmen who were spending too much time smoking in the washroom. It was thought, however, that firing was too easy an out and besides, the men were needed. The solution was to assign a janitor to the washroom to mop it down repeatedly all day long. Annoyed by the continuous swish of water and swishing mop handle, the shopmen soon stopped loitering. Moreover, the apparently legitimate cleaning operation afforded no grounds for complaint.

The employees' high morale is manifested in many ways. During the war, turnover was less than 2.75 per thousand in comparison with the industry's average of 5.5 per thousand. Grumman has never had a strike or slowdown. In emergencies, workers have even exceeded their normally high production schedules. When the Navy lost an unexpected number of planes on Guadalcanal, the workers were called in over the weekend to make up the deficit. Although regular production was at that time 3 planes per day, they uncrated spare parts already packed for shipping and assembled 23 planes in the following 24 hours. Through wholehearted participation in the incentive program, production efficiency was so increased that the company was able to reduce the unit price of the Hellcat fighter (not including engine and other government-furnished equipment) from $50,000 to $35,000 - a saving to the government of $127.1 million.

FACILITIES EXPANSION

In addition to the difficulties of acquiring and maintaining an adequate labor force, there was the overwhelming demand for more and more

shop space. Implementation of the federal preparedness program of 1939-40 started a series of government financed plant expansions that progressed as follows:

1941	Plant 2, Assembly plant	464,000 sq.ft.
1942	Plant 3. Subassemblies	168,000
1942	Warehouse	148,000
1942	Plant 4. Hangars	150,000
1942	Misc. plant 1 additions	140,000
1943	Plant 3, addition	432,000
1943	Plant 2, addition	304,000
1943	Warehouse additions	250,000
1944	Inspection facility	25,000
1945	Plant 5, engineering and experimental	310,000
1945	Garage	18,500

In support of the Bethpage activity, manufacturing spaces were occupied in the following Long Island communities from 1942 to the close of the war:[9]

Amityville	13,000 sq.ft.
Syosset	47,000
Lindenhurst	46,000
Babylon	5,000
Port Washington	200,000

Supplementing the above plants was a nation-wide network of subcontractors. Many were manufacturing aircraft parts for the first time and lacked the production know-how to step right in. To reduce the change over time for

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[9]See page 165.

new parts or equipment, Grumman had certain of its older and experienced subcontractors develop the proper manufacturing methods on a limited scale in advance. The proven techniques were then passed on with the mass production contract to the less experienced.[10]

POST WAR ADJUSTMENTS

Following the end of hostilities in 1945, military contracts throughout the industry were either canceled or reduced and stretched out by extending delivery dates. The nation had a substantial surplus of planes as well as aircraft production and service facilities. To be sure there was an initial pent-up demand for commercial and private aircraft, as illustrated in Table 77, but this was soon satisfied through disposal of government surpluses and reduced military production. Throughout the industry layoffs were spasomdic and managed in such a manner that employees were under a constant shadow of doubt as to their future. Many such companies are facing today labor problems that originated in this period.

Grumman's policy, on the other hand, was direct and left no room for speculation. Each of the 21,000 workers was given a friendly farewell and a diploma-like dismissal notice. This gave everyone a haad start getting new jobs while there was still a sizable demand for labor in the community. A committee was then formed to hire back over 4,000 of those Grumman wanted permanently.

In 1948 the backlog of military orders had grown to the point at which fulfillment by Grumman alone would require a considerable, if only

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[9]Personal interview with Mr. W. E. McKay, Grumman Aircraft Engineering Corp., 30 March 1956.

[10]Navy Department files.

TABLE 77

UNITED STATES AIRCRAFT PRODUCTION
1915 - 1954

Year	Total Units	Military	Civilian
1915	178	26	152
1920	328	256	72
1925	789	447	342
1930	3,437	747	2,690
1935	1,710	459	1,251
1940	12,804	6,019	6,785 a
1941	26,277	19,433 b	6,844 a
1942	47,836	47,836 b	-
1943	85,898	85,898 b	-
1944	96,318	96,318 b	-
1945	49,761	47,714 b	2,047
1946	36,670	1,669	35,001
1947	17,717	2,100	15,617
1948	na	na	7,302
1949	na	na	3,545
1950	na	na	3,520
1951	na	na	2,477
1952	na	na	3,509
1953	na	na	4,134
1954	na	na	3,389

World War I production not included.
a - Does not include export.
b - Includes U. S. financed planes mfg. in Canada.
na - Not available.

Source: The Conference Board "Economic Almanac, 1956"

temporaty, staff reinforcement. Forced to choose between an unwieldy, unstable labor force or subcontracting, the company chose the latter.

Five or six contractors such as Glenn L. Martin in Baltimore and Twin Coach in Buffalo agreed to do whatever part of the job Grumman's permanent employees could not handle. The plan was that if the new orders failed to hold, only the subcontractors would have to be let go; if they grew, employment would not increase too much and the subcontractors would get more work.[11]

KOREAN EMERGENCY AND EMPLOYMENT POLICY

The plan proved successful and employment, as of June 1950, had been held to a force of 6,263 workers. With the outbreak of the Korean conflict an extensive subcontracting program was undertaken to avoid over-expanding plant facilities and personnel. Major assembly items were farmed out to companies located in labor surplus areas as distant as Buffalo, Detroit, and Memphis. Subcontractors supplying crates or other small work were selected from those in close proximity to Bethpage.[12]

It was found necessary to reoccupy all of the World War II buildings at Bethpage (those government buildings that had not been purchased after the war were again leased), lease considerable warehouse space in neighboring communities, as well as expand into government financed additions to Plant 5 for a flight test hangar, structures laboratory, and engineering wing.

The growth of employment for the period 1950 - 1955 was much more

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[11]"Grumman Cleared for Take-off," Fortune, Vol. XLII, No. 3, Sept. 1950, p. 72.

[12]Personal interview with Mr. L. G. Evans, Grumman Aircraft Engineering Corp., 5 March 1956.

controlled than during 1940 - 1945, as can be seen from the following tabulation:

Year	No. of Employees
1940	1,725 as of 31 Dec.
1941	6,644 "
1942	19,556 "
1943	25,094 "
1944	21,607 "
1945	4,670 "
1946	4,440 "
1947	3,379 "
1948	4,564 "
1949	(5,200) estimate
1950	6,263 as of 30 June
1951	7,990 average for year
1952	10,327 "
1953	11,228 "
1954	11,400 "
1955	12,025 "

Grumman adhered to its policy of refraining from employing people not established residents of Long Island. It was not desired to contribute to a "boom-bust" situation which might result in large numbers of unemployed should the emergency demand cease. The percent turnover per month, which was less than 1 percent in 1951, was reduced further to 0.45 percent by 1955.

Considerable effort was expended in locating and recruiting former

employees so as to have a minimum effect on the local labor situation. In addition, care was taken to refrain from competing for labor by offering increased wage rates.

The personnel problem was aggravated by the parallel expansion of neighboring defense plants, notably Republic Aviation, and when it was found that sufficient numbers of trained, experienced shop mechanics were not available, evening training programs were instituted in cooperation with local schools in Floral Park, Freeport, and Farmingdale. Experienced employees were furnished to assist the school faculties in teaching needed skills such as riveting, electrical assembly and soldering, and template making.

A "vestibule" school under competent employee instructors was used to orient trainees as they were inducted from the evening training classes. Various departments also initiated on-the-job training to meet individual needs.

Where there were shortages of trained personnel in specialized skills, careful study was made of the permanent work force. Where feasible. interdepartment transfers were effected to satisfy production requirements.[13] Although most companies experience condiserable difficulty with inter-shop transfers, Grumman accomplishes them with relative ease because under no circumstances is a transferred worker asked to take less pay.

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[13]Memorandum of Mr. P. S. Gilbert, Grumman Aircraft Engineering Corp., 5 Oct. 1955. "Problems related to expanding the work force for increased production due to the Korean Crisis of 1950."

EDUCATIONAL PROGRAMS

To encourage the up-grading of qualified employees with the prerequisite education, the Grumman Night Engineering Scholarship Plan was inaugurated in September 1951. Upon satisfactory completion of college level courses taken, the individual is reimbursed in full for tuition fees plus certain incidental expenses. Adjustments in work schedules are arranged to accommodate the classes, and any time lost from the normal pay check because of class attendance is made up by the company on the assumption that class time is as valuable as production time. The following is a summary of employee participation in the plan since 1951:

School Term	No. of Participants
Sept. 1951 - Jan. 1952	57
Feb. 1952 - June 1952	81
Sept. 1952 - Jan. 1953	118
Feb. 1953 - June 1953	166
Sept. 1953 - Jan. 1954	269
Feb. 1954 - June 1954	304
Sept. 1954 - Jan. 1955	407
Feb. 1955 - June 1955	393
Sept. 1955 - Jan. 1956	500 (estimate)

The plan is not restricted to the bachelor's degree. A recent count showed eighty employees studying for master's degrees and eight working toward their doctorates.

The above plan is restricted to actual employees. Previously, in 1944, the company had founded a program of full-tuition, four-year

scholarships for outstanding students of Nassau and Suffolk Counties. The student is free to specialize in either aeronautical, mechanical, civil, or electrical engineering provided his primary interest is a career in the aviation industry. Actual school selection is made by the scholarship holder, provided the desired school is approved by the Accrediting Committee of the Engineers' Council for Professional Development. Although expected, it is not mandatory that the student work at Grumman during vacations. Graduates are normally employed by the company if suitable positions are available. To date the program has added 123 engineers to industry.

RESIDENTIAL DISTRIBUTION

The vast majority of Grumman employees live in areas surrounding the Bethpage plant. Some commute from as far north and east as Port Washington, as far south and west as Freeport, as far south and east as Bay Shore, and a few travel from points as distant as Manhattan, Westchester County, and Patchogue, Long Island.

Precise information concerning employee residence is not available. Table 78 will, nevertheless, illustrate the pattern of complete employee dispersion throughout the Long Island community. It will be noted that the tabulation includes only those persons working in the government owned portions of Grumman's facilities and who are also parents of school age children. It is reasonable to assume that the total number of Grumman employees residing in each school district is considerably greater than the figures shown. Inasmuch as a few military personnel are assigned inspection-liaison duties at Grumman, they might be included in the tabula-

tion but, because this group is small in comparison with the total employed, its effect is negligible.

Similar type industries and government installations situated throughout the length of Long Island in both rural and urban communities have been included in the tabulation for comparison purposes.

Information on School District BR-11, Centereach, was incomplete and although shown on Figure 13 is not included in Table 78. The available data indicated, nevertheless, that both Grumman plants as well as the Republic Port Washington Plant, the Naval Ordnance Syosset Plant, and the Brookhaven Laboratories have employees living in this district.

EXPANSION FROM BETHPAGE

One of the many things about Grumman that has impressed its first and foremost customer, the Navy, is the unusual speed with which it can take an experimental airplane from the design stage through all of its developments and tests to large-scale production. Furthermore, with less floor area than almost any other manufacturer in the country, Grumman was a war production leader. In October 1943 it produced 345 F6F fighters and 161 TBF torpedo bombers, while at the same time carrying the heaviest wartime experimental and development program of any producer of naval aircraft. The program at that time involved much conversion of existing models to new uses as well as the development of three new fighters and a torpedo bomber.[14] To accommodate the various experimental parts-manufacturing departments it was found necessary to borrow space from production. Months

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[14]Navy Department files.

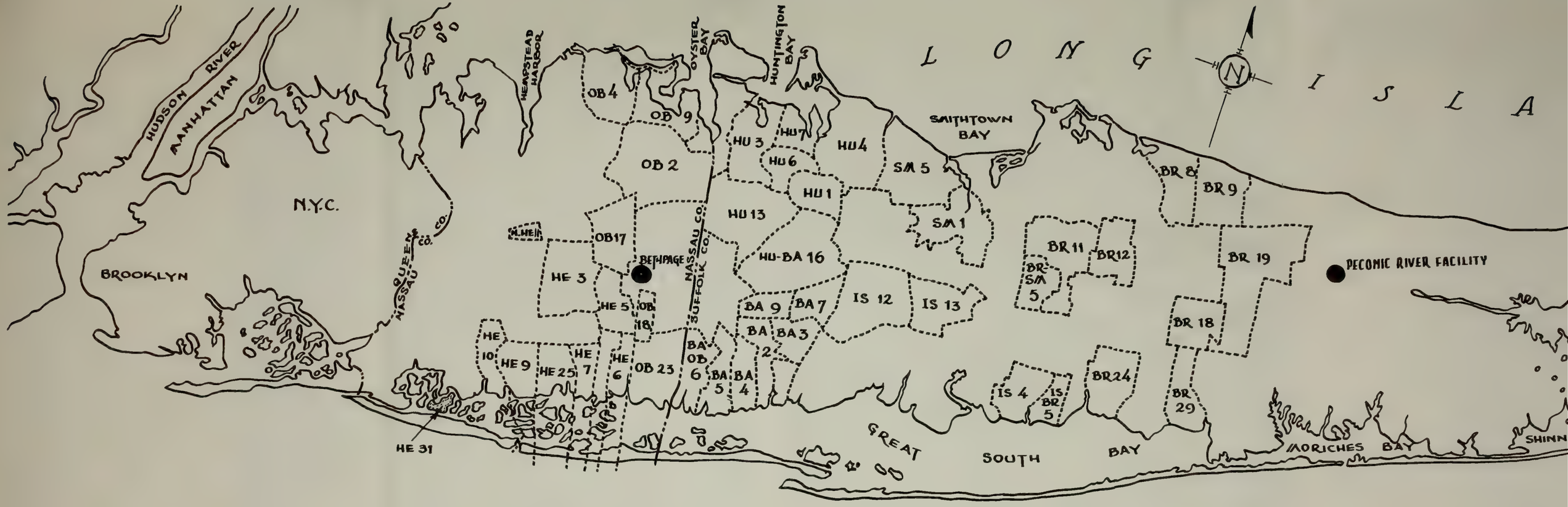
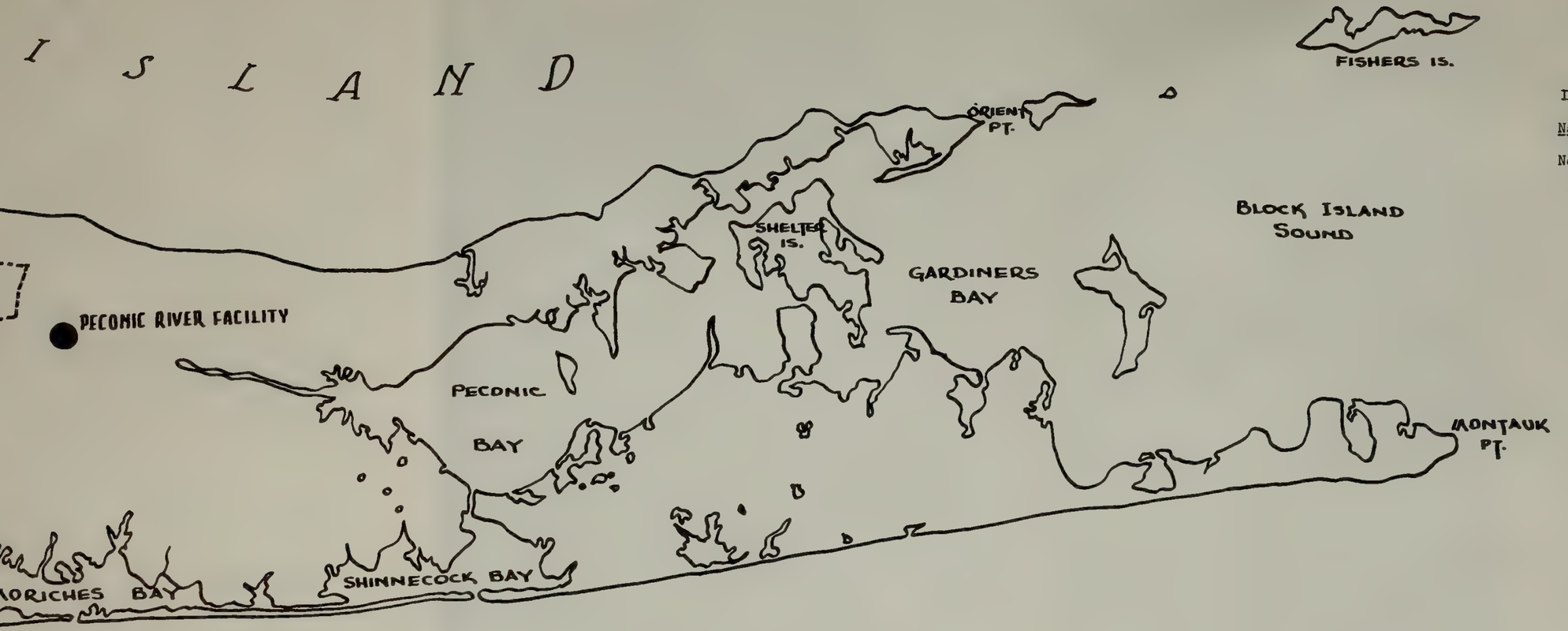

HUDSON RIVER
MANHATTAN
N.Y.C.
BROOKLYN
QUEENS CO.
NASSAU CO.
HEMPSTEAD HARBOR
OYSTER BAY
HUNTINGTON BAY
NASSAU CO.
SUFFOLK CO.
SMITHTOWN BAY
L O N G I S L A
A T L A N T I C O C E
N
OB 4
OB 9
OB 2
HU 3
HU 7
HU 6
HU 4
SM 5
HU 1
HU 13
SM 1
ALHEIM
OB 17
BETHPAGE
HE 3
HU-BA 16
HE 5
OB 18
BA 9
BA 7
IS 12
IS 13
BA 3
BA 2
HE 10
HE 9
HE 25
HE 7
HE 6
OB 23
BA OB 6
BA 5
BA 4
BR-SM 5
BR 11
BR12
BR 8
BR 9
BR 19
PECONIC RIVER FACILITY
BR 18
IS 4
IS BR 5
BR24
BR 29
HE 31
GREAT SOUTH BAY
MORICHES BAY
SHINN
0 2 4 6 8 10
SCALE - MILES

FIGURE 13



INDEX - SURVEYED PUBLIC SCHOOL DISTRICTS

Nassau County		Suffolk County	
No. HE 11	Carle Place	BA 2	West Babylon
OB 2	Syosset	BA 3	North Babylon
OB 4	Locust Valley	BA 4	Lindenhurst
OB 9	Oyster Bay	BA 5	Copiague
OB 17	Hicksville	BA 6	Amityville
OB 18	Plainedge	BA 7	Deer Park
OB 23	Massapequa	BA 9	Wyandanch
HE 3	Mepham	SM 1	Smithtown
HE 5	Levittown	SM 5	Kings Park
HE 6	Seaford	HU 1	Elwood
HE 7	Bellmore	HU 3	Huntington
HE 9	Freeport	HU 4	Northport
HE 10	Baldwin	HU 6	Greenlawn
HE 25	Merrick	HU 7	Centerport
HE 31	Island Park	HU 13	South Huntington
		HU & BA 5	Dix Hills
HE - Hempstead		IS 4	Bayport
		IS 12	Brentwood
OB - Oyster Bay		IS 13	Central Islip
		IS & BR 5	Bayport
BA - Babylon		BR 8	Miller Place
		BR 9	Rocky Point
SM - Smithtown		BR 11	Centereach
		BR 12	Selden
HU - Huntington		BR 18	Yaphank
		BR 19	Ridge
IS - Islip		BR 24	East Patchogue
		BR 29	Brookhaven
BR - Brookhaven		BR & SM 5	Lake Ronkonkoma

SURVEYED PUBLIC SCHOOL DISTRICTS
PUPILS WHOSE PARENTS WORK ON FEDERAL PROPERTY
NASSAU AND SUFFOLK COUNTIES, NEW YORK
1 MARCH 1955
GOVERNMENTAL STATISTICAL CORPORATION

TABLE 78

School District	Parents of school age children living in school district and working on Federal property indicated, 1 March 1955.							
	Grumman Plts 3&5 Bethpage	Grumman Peconic	Mitchell A.F. Base	New York Navy Yard	Republic Av. Corp Pt. Wash	Naval Ord. Plt. Syosset	Brookhaven Laboratory	Suffolk City USAF Base
BA - 2, West Babylon	54	2	5	18	13	3	0	0
BA - 3, N. Babylon	42	6	6	6	4	0	0	0
BA - 4, Lindenhurst	105	1	11	45	19	0	1	0
BA - 5, Copiague	42	10	8	4	17	0	1	0
BA - 6, Amityville	57	0	2	1	8	6	0	0
BA - 7, Deer Park	14	6	5	6	9	0	0	4
BR-SM - 5, Lake Ronkonkoma	10	28	0	5	0	0	8	0
BR - 8, Miller Place	0	4	0	0	0	0	12	0
BR - 9, Rocky Point	0	14	4	4	0	0	10	0
BR - 12, Selden	4	11	0	0	0	4	16	0
BR - 18, Yaphank	3	10	0	0	0	0	45	0
BR - 19, Ridge	1	3	0	1	0	0	24	0
BR - 24, Patchogue	18	68	1	5	4	0	222	23
BR - 29, Brookhaven	1	4	0	0	0	0	53	0
HE - 3, Mepham	205	0	24	52	7	0	7	0
HE - 5, Levittown	146	5	129	79	37	1	1	0
HE - 6, Seaford	24	2	2	13	6	2	0	0
HE - 7, Bellmore	49	0	3	21	0	0	0	0
HE - 9, Freeport	67	2	11	27	27	3	0	0
HE - 10, Baldwin	116	0	25	59	17	6	4	0
HU - 3, Huntington	254	6	2	4	29	4	2	0
HU - 4, Northport	131	34	9	19	21	29	3	0
HU - 6, Greenlawn	21	14	3	3	2	2	3	0
HU - 7, Centerport	28	0	1	0	1	2	0	0
IS - 4, Sayville	44	34	7	0	3	0	44	0
IS -BR-5, Bayport	6	24	0	2	0	0	85	1
IS - 12, Brentwood	13	5	0	10	2	2	2	0
IS - 13, Central Islip	30	11	4	18	5	1	2	0
N.HE-11, Carle Place	18	0	32	3	9	0	0	0
OB - 2, Syosset	44	0	8	7	5	18	0	0
OB - 4, Locust Valley	45	0	2	0	5	3	0	0
OB - 9, Oyster Bay	80	0	0	0	0	11	0	0
OB - 17, Hicksville	190	8	56	54	39	6	0	1
OB - 18, Plainedge	63	0	34	26	15	6	0	0
OB - 23, Massapequa	130	4	20	33	17	0	6	0
SM - 1, Smithtown	44	41	6	3	0	5	29	0
BA - 9, Wyandanch	6	2	0	5	0	0	1	0
HE - 25, Merrick	42	0	0	4	0	0	0	0
HE - 31, Island Park	2	0	0	8	0	0	0	0
HU-BA-5, Dix Hills	44	2	5	1	4	7	0	0
HU - 1, Elwood	5	0	0	7	0	0	0	0
HU - 13, South Huntington	101	9	0	8	21	16	0	0
SM - 5, Kings Park	9	0	5	2	2	0	0	0

Source: Information derived from data furnished by Governmental Statistical Corp., New York

Method of calculation: $\frac{A}{B \times C} = D$

where A = Total number of pupils enrolled in listed district public schools whose parents are employed on Federal Property indicated. Determined by actual count.

B = Factor for conversion of public school enrollment to total school enrollment to total school age children in district. Developed from G.S.C. studies.

C = Factor for conversion of total number of district's school age children to total number of parents employed on Federal Property indicated. Developed from G.S.C. studies.

D = Total number of parents employed on Federal Property indicated having school age children. Figure used in above tabulation.

Note: To avoid disclosure of G.S.C. conversion factors, actual calculations are not presented.

Table - Residence by School District of Persons (Parents of School-age Children) Employed on Selected Federal Properties, Long Island, New York, 1 March 1955.

later when the new planes (for example, F7F Tigercat and F8F Bearcat) had completed their initial stages, this borrowed space had to be returned so that production could meet its delivery dates.

Plant 5, Engineering and Experimental, helped relieve this congestion in 1945, but the increased tempo of research and development necessitated further expansion of Plant 5, as noted previously, during the Korean emergency. In developing the F9F Panther jet fighter, it was obvious that the physical features of the Bethpage site had basic inadequacies which precluded further expansion of the airport to accommodate flight testing of the new jet aircraft.

To meet these new requirements, the Navy constructed in 1952-54 the 4,500 acre Peconic River Facility in the relatively unpopulated, rural area of eastern Long Island not far from Riverhead. In addition to two runways (10,000 and 7,000 feet) for flight test operations, facilities were provided for final assembly of all jet aircraft to be produced by Grumman. Subassembly of the jet aircraft components as well as production and testing of propellor type aircraft remained at Bethpage.

COMMUNITY RELATIONS

Realizing that through its employees Grumman is an integral part of the community of Long Island, the company takes an active interest in community life. A Little League was started in 1952 for youngsters of the Bethpage area. Four teams were completely outfitted, and the following year, on an unused 22-acre portion of company property, four baseball diamonds were constructed and made available for community use.

In 1950, Grumman organized local industrial interests and founded

the Long Island Industrial Hospital Fund. Funds are raised through combined corporate and labor cooperation at the exceptionally low administrative and continuing educational cost of only 7 percent. In six years the organization has raised over $1 million which has been turned over to 19 voluntary, nonprofit Long Island hospitals.

During World War II the company was a consistent War Bond leader, and in 1955 its employees set a national record of 99.09 percent participation in the payroll deduction Savings Bond plan.

An organization the size of Grumman must of necessity coordinate its actions with those of the community to achieve the benefits derived from mutual cooperation. The Plant Protection Department, for example, coordinates the traffic and criminal violation problems with the Nassau County Police Department, the District Attorney's Office, and the Federal Bureau of Investigation. The Navy is, of course, very much interested in the security of its many classified projects. Company police attend classes given by various law enforcement agencies and receive instruction in First Aid from the company's qualified instructor who is affiliated with the Nassau County Red Cross Chapter. One of the employees, trained and qualified by instruction from the FBI, conducts a training program in which other members of the Department are qualified in the use of their fire arms.

Fire protection activities are joined with the Bethpage Fire Department and the Nassau County Fire Marshall's Office. These organizations are kept up to date on Grumman's fire equipment as well as the locations of stored combustible materials.

TAXES

Local real property taxes face all land owners and Grumman is no exception. The Long Island school districts have had a tremendous burden placed upon them to provide adequate school facilities and teachers for the armies of children that have recently moved into the region. Taxes derived from residential property are far below operating needs and the industrial properties are therefore called upon to carry a very heavy load. Mr. James L. Niland, real estate appraiser and consultant, made a study in 1950 of the Nassau County method of realty valuation assessment. The study resulted in the following conclusions:[15]

> "(There has been) No revision of assessed land valuations in locations where there has been no decided change in utilization since 1945 even though sales show substantial enhancement in market values.
>
> "(There has been) No variation in basic land or building (assessed) unit values where properties were improved (new buildings) in the period 1940-45, except that improvements sponsored by the Federal Government, where exempt or taxable (through Defense Plant Regulations) have almost without exception been valued for assessment purposes on an actual cost basis, at unit rates, far above the standard units used in the Cleminshaw* reassessment which remain applicable to virtually all other properties in the county which existed prior to 1945.
>
> "Both land and building units (for assessment purposes) applied to residential properties, new since 1945, are relatively far below those applied to a few new (since 1945) industrial properties, and all Federally sponsored properties, to an extent which shows ratios, assessed valuations to selling prices, for the new residential properties of 40 to 60 % compared to 100 % and up for the Government properties."
>
> * About 1939 the J. M. Cleminshaw Co. completed a reassessment survey for Nassau County which was based on unit prices developed from 1937-38 land transactions and construction costs.

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[15] Personal interview with Mr. J. L. Niland, Real Estate Appraiser and Consultant, Brooklyn, New York, on 27 March 1956.

It would appear from the above that the tax structure of Nassau County did not provide equity for all. Subsequent changes shortly after Mr. Niland's study have relieved this condition to some extent.[16]

The Bethpage site is within the jurisdictions of more than one school district. For the most part, however, it is within Central Park School District No. 21, Nassau County. Table 79 is a tabulation of that district's total assessed valuation and tax rate per $100 for the period 1928 - 1956. As will be noted, the current trend of increased rates parallels the intensive residential development which began about 1950.

TRANSPORTATION

Transportation on Long Island is for the most part dependent upon the highway, notwithstanding the existence of the Long Island Railroad. Prior to 1940 facilities were adequate for the company and its few hundred employees. With the influx of thousands of workers plus the expanded production operations (the majority of subcontractors' work is transported to Bethpage by truck, although the plant does have three railroad sidings) some highway access improvement was required. Financed with Federal funds, these improvements were designed by the company in cooperation with county and state highway agencies and generally speaking have remained intact without further extension. On the whole it was the rapid, over-all development of the entire area, rather than Grumman's operations alone, that brought about any general highway improvement work.

Those wartime employees who commuted by train were provided a

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[16]Personal interview with Mr. C. Kingsley, Grumman Aircraft Engineering Corp., 7 May 1956.

TABLE 79

NASSAU COUNTY, NEW YORK
CENTRAL PARK SCHOOL DISTRICT NO. 21

Year	Assessed Valuation	Rate
1928-29	$2,352,870.	$1.45
1930	2,449,150.	1.70
1931	2,487,530.	1.85
1932	2,397,695.	1.70
1933	2,521,255.	1.48
1934	2,310,500.	1.72
1935	2,234,965.	1.66
1936	2,261,485.	.87
1936-37	2,302,860.	1.57
1937-38	2,488,630.	1.42
1938-39	2,941,245.	1.42
1939-40	4,094,885.	.83
1940-41	4,215,935.	.88
1941-42	6,455,495.	.59
1942-43	8,126,135.	.59
1943-44	12,753,825.	.52
1944-45	6,105,567.	1.00
1945-46	6,204,222.	1.00
1946-47	6,435,662.	1.00
1947-48	6,401,257.	1.35
1948-49	15,255,980.	.74
1949-50	12,038,820.	1.06
1950-51	12,693,210.	1.63
1951-52	14,414,645.	1.87
1952-53	16,383,025.	2.65
1953-54	18,791,910.	2.65
1954-55	24,710,640.	3.00
1955-56	33,736,627.	3.95

Source: Department of Assessment, Nassau County, New York

station, with the cooperation of the railroad, at the plant's fence.

Because of the railroad's inaction in correcting an unguarded grade crossing near the station on a major north-south highway (several fatalities occurred there), Grumman financed the installation of automatic gates and signals. Later in 1950-51 it became necessary to lengthen the plant's main runway which involved a relocation of the highway, grade crossing equipment and train stations. Although the Long Island Railroad attempted to prevent the extension by court action (it had since become extremely safety-conscious as a result of unfavorable publicity following a train wreck attributed to neglect in safety planning) the project was approved by the New York State Public Service Commission with the active support of Nassau County. Grumman donated right-of-way for the relocated highway and financed movement of the grade crossing equipment and stations.[17]

UTILITY SERVICES

Except for wartime austerity regulations, utility companies have had no unusual problems in furnishing adequate electrical, gas, and telephone services. In all cases the services have been scheduled to meet expanding requirements. Water demand has, however, far exceeded the limited capacity of the local water district. In all plants, except for the original factory building and warehouses where use is relatively light, Grumman has provided its own wells. Air conditioning equipment, rather than industrial processes, creates the large water demand. There has been nothing to indicate that future demands will exceed the capacity of the wells.

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[17] Personal interview with Mr. W. E. McKay, Grumman Aircraft Engineering Corp. on 30 March 1956.

Recently the water district, which was by coincidence located on adjoining property, determined its facilities inadequate to meet the community's future needs. Through Grumman's excellent community relations a swap was effected whereby, in exchange for a certain amount of money and property more suited to its needs, the water district deeded the old facilities and land to Grumman.

Water conservation and possible water contamination by objectionable industrial wastes have become increasingly important on Long Island. In response to requests, Grumman is presently examining all processes where water wastes are created to insure compliance with Health Department regulations. For example, until such time as Peconic River Facility operations warrant installation of a duplicate system, certain paint wastes produced in the final phases of manufacture are hauled by truck to Bethpage for treatment and disposal. There are also occasions where the deleterious effects of a fluid waste may be debatable, but where treatment is desirable from a public relations standpoint. Grumman is not insensitive to such situations in its efforts to enhance its community standing.[18]

SUMMARIZATION

It is evident from the materials presented in this and the preceding chapter that the history of Grumman reflects to a large extent the industrial history of Long Island. The company has, in its growth, influenced much of the community's social and economic patterns. As a member of the industrial structure, Grumman occupies a position of leadership.

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[18] Ibid.

Furthermore, the company is a strong component of the nation's defense industry, and as such is dependent upon the annual fluctuations of the military budget. Long Island is gradually becoming aware of the fact that, because of the nature of its industrial structure, it too is strongly bound to the decisions of the Armed Sercices Committee of Congress.

Present world unrest has produced a favorable economic environment which is tending to foster an accelerated growth situation on Long Island. Unfortunately, industry and community have now reached the point where both are competing for the same space in which to expand.

PART IV

THE PROBLEM

INTRODUCTION

What is it that makes the community and the airport look upon each other as mutually undesirable neighbors?

It wasn't too long ago that most military and commercial airfields were situated in relatively uninhabited areas well removed from congested residential sections. The early slow-flying, light planes required short runways and could take off with little or no disturbance to nearby residences. Fortunately for the few who did live in proximity to the field, engine noise was of such a low intensity that after the first introduction it soon fitted into the same category as the passing freight train or heavy city traffic.

SAFETY

The wartime mass migration from the farm to the city partly reversed itself in the postwar years and many of the once isolated airfields have been engulfed and surrounded by urban areas extending ever outward from the central city. Airplane crashes occurring during the process of landing or take-off, which formerly had passed unnoticed by the public, were starting to take their toll of lives and property in nearby communities and arouse concern. It was quite a shock to even the unimpressible, matter-of-fact city dweller several years ago when an Air Force bomber, lost in a heavy fog, actually flew into the Empire State Building.

INCREASED TRAFFIC

Prior to the late 1930's, aviation activity was limited to a comparatively few commercial, military, and private aviation enthusiasts. The

number of people who had actually flown, or had been close to an airplane, were few and far between.

World War II changed all this. Commercial air traffic increased by leaps and bounds. The military have become air minded and many of the younger generation that have been in the air one or more times have yet to take their first train ride. Table 80 demonstrates this shift in method of travel by comparing the annual passenger-mile records of the scheduled domestic airlines and the Pullman car. It should be noted that during the period 1930 to 1940 the airlines' annual share of total passenger miles jumped from 0.7 percent to 11.4 percent. During the nine-year postwar period 1945 to 1954 the airlines' portion leaped from 11.0 percent to 69.8 percent. In 1954 the airlines recorded 16.77 billion passenger miles.

Dispersed throughout the airways' network at various elevations, this volume of traffic is not noticeable; however, at airports such as at Newark, New Jersey, the traffic is concentrated and continuous. The large heavy planes must carefully approach the runways by following relatively low angle glide paths which invariably seem to pass over residences. When an airplane roars overhead at less than 500 feet elevation, the person enclosed in a building below is positive the thing is coming through the roof. After several of these experiences the homeowner becomes quite vocal in his protests and soon the airport operator and airline are involved in numerous injunction efforts, protest meetings, and damage suits. As recently as twelve months ago numerous villages in the New York area, acting in protest, passed ordinances forbidding planes from flying less than 1,000 feet over their areas.[1] The fact that such laws may not be legally enforcible

[1]American Aviation Daily, 26 Oct. 1954 and 30 June 1955.

TABLE 80

SCHEDULED DOMESTIC AIRLINES AND PULLMAN CAR PASSENGER MILES
1930 through 1954

Year	Passenger Miles (in thousands) Pullman	Airline	Airline as Percent of Total
1930	12,515,000	85,125	0.7
1935	7,146,270	316,336	4.2
1940	8,213,879	1,052,156	11.4
1941	10,070,407	1,384,733	12.1
1942	19,071,589	1,418,042	6.9
1943	25,891,466	1,634,135	5.9
1944	28,267,091	2,178,207	7.2
1945	27,275,789	3,362,455	11.0
1946	20,672,367	5,947,956	22.3
1947	13,515,792	6,109,508	31.1
1948	12,171,525	5,980,993	32.9
1949	10,543,976	6,752,622	39.0
1950	9,174,471	8,002,825	46.6
1951	9,892,551	10,566,182	51.6
1952	9,335,661	12,528,318	57.3
1953	8,200,188	14,760,309	64.3
1954	7,271,066	16,768,713	69.8

Source: The Conference Board, "The Economic Review, 1956"

does not assuage the enmity behind them. Furthermore, the contention of airport operators that the recently arrived homeowners moved into the objectional noise areas of their own free will is considered by many to be evasive and high handed.

NOISE NUISANCE

The aircraft ground noise situation has in the past few years, unfortunately, become worse rather than better with the advent of the new supersonic jet planes.

A unit of sound, or noise, is the decibel. It increases in intensity geometrically, rather than arithmetically, so that 20 decibels represents not twice as much, but 10 times as much noise as 10 decibels. One hundred-twenty decibels is 1,000 times as much noise as 90 decibels. The average whisper measures approximately 40 decibels. A pneumatic drill puts out about 80. and at 90 decibels there is danger of loss of hearing. Noise in excess of 140 decibels produces pain. A person standing at a position 100 feet to the rear and 20 degrees off from the Air Force jet fighter F100 will receive 112 decibels. If he stood directly behind, but out of the heat blast, Air Force doctors believe the brain would be ruptured.[2] Imagine, therefore, the frightening intensity of noise produced when a jet fighter takes off using an afterburner (a device which is in effect an auxiliary jet engine used to achieve extra power for short periods).

When a jet plane exceeds the speed of sound it produces a conical shaped pressure or sound wave in the air that moves along with the plane.

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[2] American Aviation Daily, 14 Feb. 1955.

As this wave speeds along the ground it produces a characteristic boom noise. If the plane makes a pass at a distance of 200 feet, an observer will experience a pressure jump of about a quarter pound per square inch. Such pressure jumps are more than enough to break windows or damage light structures. They are guaranteed to awaken even the most sound sleeper and upset the status quo of the "talkin'est ladies' bridge club."

Further, booms are not limited to low level flights. Most of them have been associated with high altitude steep dives in which supersonic speed was achieved for only a few seconds. During this short period the shock waves are formed and continue on to the ground after the plane has leveled off and slowed down. Since the wave is conical in shape, by the time the boom hits the earth it can affect an area of several hundred square miles.[3]

For the present, jet aircraft have been limited to military operations. Many communities and airport operators are quite positive in their demands that the situation remain so until the jet noise problem is satisfactorily eliminated.

The position of The Port of New York Authority is that, except for specific cases in which permission is granted, jet aircraft operations will be banned until such time as jet aircraft can be designed to operate to and from PNYA terminals without excessive noise characteristics that would be intolerable to the neighboring communities.

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[3]F. L. Daum, Aeronautical Research Laboratory, WADC "The Thundering Heard," an article in an unidentified publication.

FIELD CARRIER LANDING PRACTICE

There is another aspect of the noise problem which is peculiar to naval aviation. In order that pilots can acquire and maintain proficiency in landing aboard carriers, they must continuously practice the standard procedure known as Field Carrier Landing Practice, or simply FCLP. With the assistance of a Landing Signal Officer stationed on the runway, the pilot makes his approach and touch-down, then takes off on full throttle without stopping, makes a series of standard left turns for another approach and "bounce" off the runway. The pattern of flight is roughly elliptical and held to a maximum altitude of 300 feet to simulate the approach as it would be made onto the deck of a carrier at sea. The experienced pilot will maintain a pattern relatively close to the runway; however, the novice does better if he extends out to about 12,000 feet. Frequency of flight usually averages a plane overhead every 30 to 60 seconds. If it is borne in mind that the odds are most favorable for a crash during take-off and landing, and that in FCLP one of these operations occurs about every 45 seconds,[4] it is readily apparent that the environs of a Navy FCLP field are not only unbearably noisy but downright hazardous.

AIRFIELD EXPANSION

As noted previously, the physical and operational characteristics of aircraft are constantly changing. True, planes still have an engine, wings, and fuselage. But scientists and engineers are busy right now

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[4] E. F. Van Lier Ribbank, "Community Planning and the Naval Air Station," U. S. Naval Institute Proceedings. Vol. 81, No. 5, May 1955, p. 541.

figuring how they can eliminate the wings. The Air Force fighter of today is as large a weapon as the World War II medium bomber, and more dangerous. The cargo plane can airlift the contents of a boxcar. Commercial airlines run regularly scheduled flights across the United States in 7 1/2 hours. In short, planes have become bigger, faster, and heavier. The mile-long runway of 1943 is now as obsolete as the planes they served. Postwar planning standards have jumped from 8,000 feet to 10,000 feet of runway and some planners are now thinking in figures even greater.

The most obvious solution to the problem is: expand the area, extend the runways, and beef-up the pavements. The harassed airport operator looks over the fence on his newly arrived, uninvited neighbors that just yesterday were so vocal in protest concerning their disturbed sleep, and asks the question, "How?"

If the airport has been spared from the sub-division urbanization process, other obstacles usually exist which are equally as formidable - highways, railroads, high tension power lines, and industrial plants, to list but a few.

The Mayor of Atlanta, Georgia, while attending a jet-age symposium in Washington, D.C. in the early part of 1956, stated the problem this way, "For fifteen years we have been madly raising funds, lengthening runways and enlarging airfields to keep up with the growth of aviation." Each year land for airport expansion is becoming more difficult and more expensive to acquire. Runways costing $1 thousand per linear foot must compete with schools and highways for the taxpayer's dollar. The Mayor is of the opinion that this situation should stop. He suggested that the time

has arrived for aircraft manufacturers to design their products to fit existing runways.[5] It would appear that the Mayor has a point.

ZONING

Land use zoning as the answer to this expansion problem has many advocates. State and local governmental agencies have zoning regulations which were set up by their planning bodies to assist development. Unfortunately, application of these guides has often been disappointing. Too frequently, persons in authority do not fully appreciate the principles upon which the regulations are based and are susceptible to demands of special interests for "rational" interpretations. The entire program thereby becomes undermined because failure to enforce regulations uniformly endangers the right of enforcement. Airport operators are, for the most part, noticeably unenthusiastic about zoning. There are many governmental authorities throughout the country who share this viewpoint.

BETHPAGE SITUATION

Grumman has not been immune from the wave of residential subdivision units rolling eastward from New York City, compare Plates 1 and 2. Levittown came first, and what space was left has been grabbed up since 1950. Grumman has, of course, tried to discourage full development of the area contiguous to its boundaries. There were contractors, however, that did build and sell homes wherever vacant land was available. One such individual planned a rather devious scheme to lure buyers by suggesting that Grumman close down the field for one day and offered to reimburse the

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[5] Witkin, R., "Vast Problems of Jet Age Harass Airlines' Planners." The New York Times, Vol. CV, No. 35,890, 29 April 1956, p.1, Sect. 1.

company for its financial loss due to the shutdown. The offer was, of course, rejected, but he had little trouble selling even with the planes flying.[6]

This bears out conclusions reached by Mr. J. L. Niland through studies conducted in 1953 of the effects of airports on real estate values in their vicinity. Little evidence was found to support the often-voiced contention that values are, to a marked degree, adversely affected. The most common complaint presented by residents of dwellings within the limits of flight paths was TV interference. As to the noise nuisance of flights, residents generally agreed that they quickly became accustomed to it and could ignore it. Generally speaking, neither insurance costs nor mortgage financing arrangements were affected.[7] There seems to be an irresistible urge for some people to live next to an airfield.

Developments in 1950 indicated that the facilities at Bethpage were becoming inadequate. Extending the runway 1,200 feet in 1951 served to alleviate, but not fully correct, the problem, inasmuch as plant facilities were too small to meet production and experimental schedules projected at that time for 1952 and 1953. Actually the extended runway, although sufficient for normal needs, was too hazardous for testing the new experimental type aircraft. If the new Navy orders were to be delivered, new plant facilities would have to be obtained.

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[6]Personal interview with Mr. L. G. Evans, Grumman Aircraft Engineering Corp. on 5 March 1956.

[7]Personal interview with Mr. J. L. Niland, Real Estate Appraiser and Consultant, Brooklyn, New York, on 27 March 1956.

PLATE - I
SEEPAGE - 1939

NEW SITE STUDIES

Early in 1951 Grumman representatives began seriously to consider expanding their permanent facilities beyond the Bethpage site. As discussed in preceding chapters, the plant's production capacity was inadequate for projected Navy contract schedules; runways were too short for testing experimental jet aircraft with safety; the surrounding residential community had established itself dangerously close to the runways; and noise from high powered jet engines (the reduction of which was not in the offing) had already resulted in many complaints from the adjacent community. It was imperative that the final assembly and testing of jet aircraft be removed to an isolated and more spacious location.

Consideration was first given to the possibility of relocating the Grumman plant in a less vulnerable point farther to the west away from the Atlantic coastline. Such a move had been made by a competitor several years previously; however, it had experienced little success in persuading its employees to move with the plant. Several years were therefore required to recruit and train replacements. During this transition period the company's production efficiency left much to be desired.

Grumman's employees are permanent residents of Long Island. They enjoy the natural advantages of its environment for recreation, proximity to New York City, and convenience of home close to work. Their natural tendency is to resist any change to their established patterns of living "on the Island."

It is the firm belief of Grumman officials that the key to their company's success is the technical knowledge, experience, and teamwork that

PART V

A SOLUTION

the employees have developed during the past twenty-six years. It was therefore decided to confine the investigative site studies to the boundaries of Long Island. This had the further advantage of reducing the problem in scope to a departmental expansion rather than a complete plant relocation. The nerve center would thus remain at Bethpage, and operations would be controlled in much the same way as during the World War II expansion.

Keeping in mind the problems that they were trying to get away from, as well as the function of the new facility, the following site features were desired: distance from existing and potential urban development; noninterference with main highways or traffic arteries; minimum interference with agricultural interests; freedom from high towers or other aerial obstructions; remoteness from air traffic patterns of other airports; satisfactory terrain for construction purposes; availability of electrical power; accessibility by highway and railroad; sufficient acreage to accommodate plant facilities and two runways approximately 10,000 feet long; and easy access from Bethpage.

Aerial observations provided a rapid survey of the entire island; however, topography and the advancing waves of urban development from the West limited consideration to the undeveloped areas east of Bethpage. Preliminary reconnaissance narrowed the choice to about ten sites; further investigation and ground surveys reduced the number to three.

The closest site to Bethpage was just south of Port Jefferson and contained only 2,000 acres. A high tension power line ran north and south through the center. Railroad facilities were not available. And the state highway department planned to run a new highway diagonally across the area in the near future.

The second site was a former Government-owned airfield. Its diminutive size and the surrounding developments precluded its selection.[1]

CALVERTON SITE

The third site lies about 50 miles east of Bethpage and six miles west of the business district of Riverhead. Of the 4,500 acres, 70% was woodland and the rest consisted of 30 potato farms, 16 farm houses, and 20 miscellaneous dwellings and summer cottages. The area is bounded on the south by a group of small lakes from which flows the Peconic River. The north boundary has 5 miles of frontage on concrete paved Route 25, the principal arterial highway connecting Riverhead and New York City.

Nearby are the hamlets of Calverton, Manorville, and Wading River; the population of each not exceeding 300 persons. Calverton and Manorville are both station stops on the Greenport branch of the Long Island Railroad, the former being a minor shipping center for farm produce and fertilizer. Manorville is residential in character, and Wading River, on the north shore, is a residential community that is expanded during summer months by small numbers of vacationers. Other summer cottage communities are scattered around the area. Except for the small towns of Riverhead and Patchogue, the whole area is rural in character and sparsely settled.

Transportation facilities are generally limited to privately owned vehicles. The Long Island Railroad provides service to and from New York by two trains daily in each direction; travel time is upwards of two hours, with the result that there is little or no communting. A bus line runs two round trips daily between Riverhead and Patchogue.

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[1]Personal interview with Mr. L. G. Evans, Grumman Aircraft Engineering Corp., 5 March 1956.

The nearest retail center of any importance and the high school are in Riverhead. Churches of various denominations are also located there as well as in the three hamlets previously mentioned.

Roadside development is sparse throughout the general area. The few examples of commercial activity have been limited to Route 25. In general, lands to the south and west consist of undeveloped and unused woodland. To the north and east most of the land is cultivated, although there are substantial woodland areas. The Brookhaven National Laboratory is located about 5 miles southwest of the site.

The Calverton site had the basic features desired by Grumman; however, to verify their selection they had an independent preliminary engineering study made of the area. The report indicated the site was adaptable to the purpose of the project.

COMMENCEMENT OF PROJECT

Satisfied that the Calverton site was the best available, an architectural-engineering concern was engaged to develop specifications and designs from which the additional facilities needed for Grumman's expansion could be constructed.

At first it was planned to acquire all the land and sell to the Navy that required for the Government-owned runways and buildings. Accordingly, 585 acres were purchased through the Montauk Building Corporation, a subsidiary of Grumman, at an average cost of $90 per acre. It was soon discovered, however, that the property had been subdivided many years previously and that several hundred owners were involved. Many of the owners, who lived in states as far away as Florida and the midwest, had

never seen their land and did not realize that the "Long Island estate" they had inherited was actually not much better than sandy, scrub pine wasteland. When it became evident that clear title to the complete area could not be purchased without Government condemnation, the company negotiated with the Navy to take over the complete project.[2]

Prior to Congressional approval, however, it was necessary that the Navy have the area surveyed and land appraised to determine acquisition costs. The private appraisers who were given the contract for this work conducted preliminary inspections between 8-14 November 1951 and submitted their reports on the 15th. The proposed facility project was approved by the Secretary of the Navy on 21 December 1951. The request for land acquisition was approved by the Armed Services Committee of Congress on 15 January 1952.[3]

COMMUNITY REACTION

In the meantime the local newspapers started publishing on 15 November 1951 articles, rather general in nature, to the effect that the Navy was contemplating acquiring a 4,500 acre tract of land in the Calverton, Wading River, Manorville area. All were presumably based on the initial visit of the appraisers during which the farm owners concerned were contacted for permission to inspect the property.

Continued agitation in the local press resulted in the Riverhead Town Board passing a resolution on 21 November 1951 requesting that a Navy representative meet with the Board and explain what the Navy contemplated

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[2] Ibid.

[3] Navy Department files.

so that the town officials could be informed on the subject.

Unfortunately, Congressional approval of the land acquisition had not yet been given to the Navy. Public announcement of the Navy's plans could not, therefore, be made, and the Board's invitation had to be respectfully declined for the time being. Articles continued in the press but for the most part they merely reworked what had previously been said and included interviews with several of the land owners whose property had been inspected by the appraisers. One farmer, who owned 125 acres of potato and cultivated land on the proposed site, was particularly vehement in his public utterances and was quoted freely.

Finally on 17 January, two days following Congressional approval, the local weekly came out with a two-inch headline "JET PLANES COMING" followed by "22 Millions for Wading River-Calverton Area," "...1,000 Acres of Cultivated Farm Land to Be Taken...Price Range $50 - $600 per Acre." In the meantime work continued toward the acquisition of land and design of the facility.

PUBLIC RELATIONS

On 31 January 1952, the Navy and Grumman sponsored a public meeting and luncheon at Bethpage with responsible public officials of the Riverhead area, the local Congressman, and some sixty interested parties including the press. Not only was the scope of the project outlined through use of area maps and explanation of the land-acquisition process, but specific inquiries from those in attendance were answered. Typical of such questions were: can farms be plowed and planted in 1952; if planted, will harvesting be permitted; if not allowed to harvest, will the crop be paid for; when

will owners have to get off their farms; when will owners be paid for the land; how much will be paid for land per acre and for farm buildings; why is this particular site wanted; and why couldn't it be shifted 2,000 feet to the west to avoid some of the farms?

The Navy's replies to the above questions are equally interesting and serve to illustrate the Government's efforts to minimize the shock of the project to the community. They are briefly summarized in the same order as the above questions.

Farms located outside the immediate construction area could be planted and harvested in 1952. In those cases where construction progressed faster than originally planned, a late harvest might not be possible. In the arrangement under which the farmer would stay on the land after the Government had acquired ownership, however, the rent would reflect this risk. The Government is prohibited by law to pay for crops not harvested after it has taken possession.

In accordance with the construction schedule each farmer would be notified several weeks, and in some cases several months, before he would be required to vacate his farm.

The exact time when payment would be made would be impossible to predict. In no instance could owners be paid before the completion of appraisals and title searches. This would not mean that a particular owner need wait until all were completed. Farms to be vacated first would be processed first. To insure prompt payment the Navy would use direct negotiations with individuals. If negotiations proved unsuccessful, the Navy's estimate of fair market value would be deposited in court and the

owner permitted to draw on the deposit without jeopardizing his claim for a higher market value before the court.

The nearby presence of Brookhaven National Laboratories with its radio towers, and the north-south Wading River Manor Road forming part of the site's western boundary, prevented shifting the site to the west. It was also necessary to acquire land north of Route 25 to provide essential runway approach zone clearance.[4]

The luncheon did much to prepare the community for the plant's arrival, and all of the guests seemed satisfied with the information received. Full coverage of the meeting was carried in the local weekly on 7 February.

Condemnation proceedings were initiated on 7 February and authority to take possession of land immediately required for construction was given by the courts on 26 February. The contractor arrived at the site shortly thereafter and on 3 March clearing operations began.

ACQUISITION AND CONSTRUCTION DETAILS

It should be noted that the Navy and the Federal District Attorney's Office handled all matters pertaining to land acquisition. The actual facilities, such as runways and buildings, were constructed as a Civil Works industrial contract with Grumman similar to that used for the wartime construction at Bethpage. In this way Grumman administered, subject to Navy approval, the subcontracts for plans, specifications, and construction under the basic prime-cost, no-fee contract. Detailed inspection of the construction work was accomplished by a private inspection firm jointly agreed upon

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[4] Ibid.

by Grumman and the Navy. For liaison purposes both organizations were represented at the site and in constant contact with the inspectors.

Western and central Long Island contributed the majority of construction workers to the contractor's force. Very few workers were recruited from the Riverhead area. Average employment during construction was 525 with the peak of 800 occurring during September 1953.[5] Most workers commuted from their regular homes; however, many actually moved into the local area and were accommodated in surrounding tourist houses, a few motels, and numerous farm houses that took in boarders. Inasmuch as these workers were distributed over an area roughly twenty miles in radius, their presence in a community well adjusted to transient vacationists had little. if any, apparent impact.

ACCESS ROAD REQUIREMENTS

Private automobiles and car pools were, in the absence of adequate rail and bus transportation, used exclusively by the construction workers in commuting to and from the work site. Inasmuch as highway traffic was expected to increase upon commencement of plant operations, the Navy and Grumman met with representatives of the U. S. Bureau of Public Roads and the New York State Department of Public Works in September 1952 to determine access road requirements.

It was estimated that the plant would be manned and operated by 2,000 employees working one shift in normal peacetime production. A more urgent national situation could be expected to increase this number 50 percent. In event of a maximum national emergency, operations would expand

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[5]Personal interview with Mr. L.G.Evans and Mr. W.E.McKay, Grumman Aircraft Engineering Corp., 5 March 1956.

to two shifts - 7,000 workers in the day and 5,000 at night. Parking facilities for 1,810 cars were included in the plans, and normal traffic out of the main gates was estimated to average 2,000 vehicles per day. Sixty percent, or 1,200 vpd, were expected to go east toward Riverhead and 40 percent, or 800 vpd, would go westward on Route 25.[6] Although employment would increase 600 percent under maximum emergency conditions, the number of vehicles at the gates was predicted to be held to 4,000 by fuel rationing, group riding, and operation of public carriers.

At the time of the access study, the only traffic information available for the area was for Route 25 and 25A (alternate east-west highway from Port Jefferson which joins Route 25 just east of the Peconic River Facility). Data from a 1951 survey were expanded from a 1-count in August 1952 for 12 daylight hours as follows:

Route 25 west of Route 25A,	6477 vpd
Route 25 east of Route 25A,	7485 vpd
Route 25A northwest of Route 25,	1502 vpd

The highway representatives considered that the state roads would be adequate and that most county and township roads would serve the increased traffic if maintenance was appropriately increased. A serious problem existed, however, on two secondary road sections which constitute the access route from the plant gate to Route 25. They had already started to break up after six months of construction traffic and were expected to be impassable within twelve months.

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[6] It is of interest to note that a spot check made by the authors of traffic leaving the Peconic River Facility the evening of 29 March 1956 revealed that most of the vehicles turned west on Route 25 and only a few turned in the direction of Riverhead.

Town and country officials advised that funds were not available for this road repair work. Local opinion was that the disadvantages imposed upon the community by the jet airfield exceeded the benefits bestowed, and local officials were not anxious, therefore, to readjust annual budgets to the detriment of roads already programmed that carry two or three times the traffic of this access road. Inasmuch as the deficiencies were serious enough to adversely affect plant operations, Federal and State highway authorities financed and performed the necessary access route improvement work.[7]

TRANSITION FROM BETHPAGE

Construction of the Peconic River Facility during the summer of 1954 had reached the point where Grumman could start operations. The Navy lease is for a five-year period with the company's right to renew for two additional five-year terms. Under the terms of the lease, rental payments are based on the productive use of the facility in terms of "man hours" with a minimum annual rental of $250,000. As the productive man hours increase, the rent increases. In addition to its defense production, which amounted to approximately 98 percent of the company's total sales for 1955, Grumman has the right to use the plant for commercial purposes with the stipulation that the facilities will be maintained in such condition that they would be at all times capable of producing military aircraft for the Navy within thirty days after receipt of a mobilization notice.[8]

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[7] Navy Department files.

[8] Personal interview with Mr. L.G.Evans, Grumman Aircraft Engineering Corp., 5 March 1956.

The move from Bethpage was accomplished in increments, so that production could be maintained at its normal efficiency. Each operation was laid out, studied, and thoroughly understood before transfer to the new plant. For example, in phasing the F9F Cougar final assembly move, the assembly line was set up at Bethpage in Plant 2 and operated exactly as it would be at Peconic. When all the kinks were straightened out, the assembly line was moved.

TRANSFERS TO PECONIC

Personnel were transferred with, or slightly in advance of, each phase (see Table 81 for tabulation of transfers). In the early stages transportation was provided between Bethpage and Peconic at company expense. Employees who were faced with an extended drive to and from the plant were paid a slight additional compensation for a period not exceeding six months. In selecting transferees priority was given, where possible, to those living in the eastern part of Long Island. Those living west of Deer Park Road (approximate halfway point between Manhattan and Peconic) that chose to buy a home closer to the new plant were offered the services of the company's legal staff and financial assistance without charge. Between March 1954 and February 1956, 169 employees had taken advantage of this assistance.

Grumman encouraged those that moved to settle in the area between Bethpage and Peconic, so that if necessity dictated a subsequent transfer back to the old plant, commuting would not be a problem. Although figures were not available, it was reported that most of the new homes were established near Route 25 in the Smithtown and Centereach areas.[9]

[9]Personal interview with Mr. C. Kingsley, Grumman Aircraft Engineering Corp., 30 March 1956.

TABLE 81

GRUMMAN AIRCRAFT ENGINEERING CORPORATION
EMPLOYEES TRANSFERRED TO PECONIC RIVER FACILITY
1954 - 1956

	Total Employees Transferred as of Date Indicated		
Date	Direct Manufacturing	Operational and Overhead	Total
9 August 1954	265	394	659
16 August	267	402	669
3 January 1955	284	440	724
17 January	284	442	726
21 March	367	471	838
23 May	550	500	1,050
10 June	na	na	1,101
29 August	690	559	1,249
23 March 1956	711	585	1,296

na - not available

Source: Grumman Aircraft Engineering Corporation

COMMUNITY RELATIONS

Considerable effort was expended by the company to effect a smooth transition into the new community. As noted earlier, the local authorities were thoroughly briefed as to the reasons for locating the plant in the Calverton area. Condemned land that was not put to immediate use was made available by lease to the original owners for the 1954 farming season. Highway officials were advised of anticipated traffic demands, so that maintenance schedules and budgets could be intelligently planned. The two local fire districts (both staffed with volunteers) were assisted in their training programs through instruction by company personnel as well as donations to aid in the procurement of needed fire-fighting equipment.

Evidently one of the major worries of the community leaders, and the cause of their initial opposition, was the fear that many of the potato pickers might be diverted to Grumman. Once it was made clear that the company needed and could only use trained personnel, this concern over labor conditions disappeared. Even though the plant is within the areas of three school districts and two fire and police districts, there have been no problems of significance. There are no zoning controls in effect which would serve to assist or hinder the facility's construction or operations.[10]

COMMUNITY PLANNING

This absence of zoning controls as well as local inertia (it might better be described as an aversion) to community planning points out a basic

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[10]Personal interview with Mr. L. G. Evans, Grumman Aircraft Engineering Corp., 5 March 1956.

weakness in the plant's situation. Under favorable economic influences, the Peconic River Facility is just as susceptible to encroaching urban development as was the Bethpage site.

To forestall this development until adequate protective devices can be established, the company has solicited the cooperation of local building associations by educating them to the undesirability of construction within a radius of two or three miles of a jet airfield. These associations have given excellent cooperation. There has been some construction, however, by small developers who are not members of such associations. Upon the completion of the presently contemplated Long Island Expressway, these scattered nuclei could be the source of future expanding developments.

PART VI

REACTIONS

REACTIONS

Whenever it becomes necessary for governmental agencies to exercise the right of condemnation through the power of eminent domain, there are immediate reactions from the people whose property is affected and from the community as a whole. The seriousness and magnitude of any objections they may have depends on the extent of the owner's loss and the influence of the new project on the community in general.

If the project involves the displacement of people, there are important consequences to be considered. Certain adjustments must be recognized regardless of the size of the group affected, its social characteristics, or the urgency of the acquisition. The changes undergone by the individuals in the group are not necessarily undesirable or tragic, but almost all daily routines are disrupted during the transition period, and permanent effects may be produced in the fundamental patterns of personal life.

The relocation disturbs the normal course of living among those moved. For those whose livelihood is derived from the land and natural resources, there is actual separation from the economic base. This may mean either a change in employment or re-establishment in another location. Perhaps no aspect of the relocation process is more complicated than the uprooting of families, for they are faced with the problem of leaving their homes, friends, and community, to which there may be strong emotional ties. If the acquisition involves land on which people depend for their livelihood, even though the home remains untouched, the consequences still disturb those affected.

In cases where governmental use removes the land from the revenue-earning tax rolls, there may be considerable distress amont the remaining residents, inasmuch as they can expect increased tax rates on their property to support the deficit. In the small, rural community this problem may be so acute that it can only be solved through the medium of state and federal assistance. The strain is intensified by the time lag between the need and relief.

Reactions are not limited to objections, however. New enterprises usually mean increased employment for personnel and industrial services, and attendant community growth. Those who normally supply these demands look upon the newcomer with anticipation and enthusiasm. It was not unusual, then, that in the acquisition of the 4500 acres for the Peconic River Facility, reactions were varied. Because of the publicity local newspapers had given the proposed governmental action prior to any official announcement, the local farmers held protest meetings. The land-holders split, if you will, into two groups: those who were willing to negotiate for the sale of their farms and to cooperate fully; and those who greeted the proposed action with muted hostility and attempts to exert pressures through political influence. The former reaction is exemplified by a letter received by the Nary: "...We received a Declaration of Taking yesterday which upset my husband and myself. Our farm is located on Swan Pound Road, Manorville, and we understand that a jet plant is soon to be started here...We will do our best to cooperate with the Government and we do look forward to knowing just what concerns our well being so that we may proceed intelligently and ecomonically..." In dealing with people who take this approach, one of the

most important aspects, often ignored by governmental agencies, is that of cementing public relations through prompt and courteous response. A check of the record shows that special effort was made on this project to speed replies, which were usually in the hands of individuals within five to seven days. Unfortunately, agencies are sometimes prevented from giving the personal touch by existing regulations and procedure, and normal official letters often serve to confuse or anger the recipient.

An example of the other extreme is the following excerpt from one of many letters received: "...We have been here in business for over 30 years and never have we ever been run over roughshod as we have in this dirty deal. For a country as great as ours to treat its citizens in such a despicable manner - is inconceivable. You take away everything we have worked so hard to keep, and insure our future - without even a warning! Telling us in March we couldn't plant our farm and not a word about our loss of income this year - only an offer of 10% over an unjust appraisal. Adding insult to injury was its only accomplishment..." While this represents a rather unreasonable objection, those in charge must at all times operate with an attitude that leaves no doubt that the government does respect the individual's viewpoint and is in sympathy with his problem. One of the difficulties in existing law is that there can be no reimbursement for loss in income or for the cost of moving to new locations. Payment can only be made on the value of the property taken. In this case, efforts were made by field forces to lessen the burden by selling back buildings to the original owner for removal; construction was scheduled around crops which the farmer had in the ground in order to enable him to harvest them,

even though he had been reimbursed for crop loss at the time of purchase. The extent to which these practices can be carried depends on the particular project and the personnel performing them.

Following the official Navy announcement of its intention to acquire the site, attempts were made to negotiate the purchase of the land with owners, the government's offer being based on an appraisal survey of each ownership. As sometimes happens, offers made to the owners were considered insufficient. The offers ran from $500 to $750 per acre for good farmland, but owners thought they should get $1,000 to $1,500 per acre; the scrub woodland price of $125 per acre was unacceptable to some, who foresaw the possible value these parcels might have as real estate development property; the government cannot, of course, offer to buy at a price based on what might be the speculative value, but must use the appraised value, plus or minus 10%, determined from the history of like sales in the immediate area over the preceding months.

After unsuccessful attempts to negotiate sales, the farmers rallied in their local farm association in a united effort to get higher prices for their land. Here we see the real problem facing the persons losing their land. The emotional reaction has given way to objective analysis of the economic problem imposed. The place where these land-owners were really hurt was the pocketbook, because they could not replace the property they were about to lose through the purchase of other land in the area. It is an unfortunate fact that there are always those who will go to any length to profit from another's misfortune. With the original announcements that the government was to establish a plant in the vicinity, land operators

took up options on available properties to await the expected rush of buyers; others purchased desirable lands outright. By the time the farmers being moved could or did attempt to find a new farm, prices had gone up beyond their reach, and they could not replace the lost property with the money they realized from the sale or condemnation proceedings.

In certain cases involving large groups of people, it is possible that Congress might pass legislation designed to assist these people in relocation, but the time lapse between the need and the relief is usually such as to render the assistance practically useless and even discriminatory. Referring to the recent University of North Carolina study--In the Shadow of a Defense Plant--which deals with the problems faced in the acquisition of the vast area required for the construction of the Savannah River Atomic Plant, Congress passed legislation enabling the payment of a relocation sum to the displaced persons. However, the passage of this legislation occurred after many of the owners had left the area, and the law contained stipulations that the funds could only be used to relieve the burden of those who had not yet left the property. Is this not discriminatory against those who willingly cooperated and gave up their land first, but who now cannot be reimbursed for any additional costs incurred?

There was no relief legislation for the owners of the Peconic properties and perhaps none was really needed, but one cannot but wonder why the legislation governing the taking of the properties of individuals should not contain provision for relocation allowance or reimbursement. The idea of relocation compensations is not a new one. There have been any number of cases abroad where, in the removal of large groups from their property,

adequate provisions were made to ease the burden.

The seriousness of the burden on the land owner who steps out onto the real estate market to replace property at an inflated or speculative value is indicated by the fact that less than a third of the permanent and semi-permanent residents of the area taken for the Peconic Plant were able, or chose, to resettle in the local area.

One of the aspects of condemnation not always made clear to the owner is that upon the filing and issuance of the declaration of taking, which empowers the government to occupy the property, the owner can draw from the money deposited with the court by the condemning agency an amount equivalent to the appraised value without prejudicing any subsequent court action for additional damages. In the case of the Peconic Plant, the Navy carefully advised people of this right, in hopes that the availability of immediate cash would lessen the financial problem and enable them to search out new land before inflated values took hold.

Due to the inability to agree on sales prices during negotiations, the Navy was placed in the undesirable position of having to resort to condemnation to acquire the necessary property. The wheels of justice turn slowly, and now, after more than three years, there are still settlements before the courts. It should be pointed out that the process of condemnation is not resorted to by the military until all efforts to conduct a satisfactory friendly negotiated sale have failed. Of course, there are always cases of clouded title that can be handled in no other way.

The only sizable portion of the property obtained through negotiated sale was that previously purchased for Grumman by the Montauk Building Cor-

poration. This 583 acre plot in the approximate center of the site was offered to the government by the corporation at the total cost incurred in its acquisition or at appraised valuation, whichever sum turned out to be the smaller. This offer was made to insure that neither the corporation nor the parent company, Grumman Aircraft Engineering Corporation, would ever be open to the slightest criticism or suspicion of having attempted to make any profit through advance knowledge of the site of the new plant.

Before leaving the field of immediate and personal reactions, the following indicates the diversity of problems that may confront people affected by such a project. A teacher in a school located on the site wrote, "...the time for signing contracts for the next school year is at hand, and I should like to know what to do. If I sign the contract and the school is closed before June of 1953, will the government reimburse me for the rest of my contract salary? If the school is closed this June, where will the children go, as most of them can remain in the district for another year?..." At Peconic this problem never materialized, for the school building was moved to a new site adjacent to the area and located on land donated by the owner. This solved the school problem before it ever really caused any difficulty. However, such is not always the case. There must be close coordination between the federal and local authorities whenever vital community services are disrupted.

It is interesting to note that the person donating the land for the school in the above case was later able to sell the rest of his holdings as desirable residential property because of the location of the school. Whether this was opportunism or just chance is left to the reader to decide.

Aside from the personal and group reaction, there was a community-wide cry from almost all residents of Riverhead Township objecting to the government acquisition because it meant that over 4500 acres would be removed from the revenue-earning tax rolls. This poses a question that is difficult to answer satisfactorily; the stand usually taken is to the effect that the new use to which the property is to be put will bring additional business and money into the area that will more than offset the loss in taxes at the immediate site. While this concept stemmed the pressure at Peconic until after the plant was in operation, the local government then tried to tax the lessee, Grumman, in proceedings that failed in the courts. Machinery is set up in New York State whereby local communities can apply for State and Federal aid to support schools, etc., in areas affected by government installations.

The only other community group objection to the new plant occurred when the farmers of the area voiced the fear that the plant would immediately compete with the local farm employer for the available labor supply. This was very quickly handled by pointing out to the community that the employees of the new plant were to be skilled workers, recruited for the most part from the parent plant at Bethpage. It is essential, when rumors of this sort start, that the people be immediately provided with sufficient information to quell local fears. Failure to handle quickly community rumors such as this can only result in serious damage to public relations. Regardless of the rights of the governmental agency and the ultimate use of the land or facility, public relations are of paramount importance.

The scope of the Peconic Plant, both in physical size and total new

employment, was insufficient to bring about any sustained "boom" in the surrounding communities. There was the usual increase in local spending by the construction workers, but many of the people commute to their jobs, and that means that they also take their pay checks out of the area. Thus the payroll is spread throughout much of Suffolk and Nassau Counties. This, of course, reduces the economic advantage to the local consumer and retail businesses. However, in anticipation that the location of the new plant would draw not only additional residents, but also other industrial enterprises, there has been considerable speculation in land and some increase in mercantile establishments in the center of Riverhead itself.

Since there are no apparent physical developments in the area that can be directly attributed to the new Peconic Plant, the field of real estate values and their fluctuations has been chosen to point out the probable effects of the plant on the area. The writers are indebted to Mr. James L. Niland, Real Estate Valuation Expert, for the material on this aspect of the problem.

In order to appreciate the effect on property values, which the Grumman Peconic Plant motivated, it is necessary to review briefly the chronology of the acquisition. Preliminary inspections of the area were conducted in November, 1951, by an appraisal team and tentative valuations established. At this time owners were informed that the government was contemplating acquisition of their property, and permission to make site inspection was requested; there were no difficulties in obtaining this permission. By January, 1952, the New York City and local newspapers were carrying general items describing the approximate location and size of the project; on 31

January, representatives of the Navy met at Riverhead with the public and local officials to inform the people of the projected plant and its physical characteristics. Immediately following this meeting the local property owners in the affected area met in what amounted to a protest meeting.

On 7 February the government filed requests for right of immediate entry for the purposes of survey and appraisal on property within the perimeter of the proposed acquisition, and on 26 February a petition for declaration of immediate possession for those parcels required for the initial construction. Construction was started within thirty days and proceeded to completion.

The publicity given the project by newspapers of New York City and the surrounding area from November 1951 through April 1952, with the estimates of employment running up to 4,000, attracted real estate speculators to the area like bees flocking to a honey tree. This resulted in the skyrocketing of land prices in this strictly rural area, as well as in the surrounding communities. This was particularly true of the larger tracts of land having poor soil and covered with scrub timber growth. A good many of these plots had been on the market for a number of years with no buyers. The sales activity was almost nil from 1945 to 1951, a time when the index of real estate transactions in Suffolk County was at a high level. The rural setting of the Peconic Plant, with its surrounding acreage of farmland and undeveloped woodland, is shown in the recent pictures in Plates 3 and 4.

As can be seen from these photographs, there is very little visual evidence of change or new development in the immediate vicinity. Except for

the construction of a few single dwellings and the start of two small residential subdivisions, there has been no activity close to the plant. The photograph in Plate 5 shows the location and size of the development located about one mile west of the site on the north side of State Route 25. Plate 6 shows the size and type of dwelling being put up in the second development which is about three miles west of the plant on the north side of State Route 25. The units are advertized to sell for from $7,000 to $9,000. There have been frequent public announcements of additional real estate subdivisions to be built, but they have not yet materialized. The only other development of any consequence is located south of Riverhead about ten miles by road from the plant. There are some fifty year-round homes in this group, and it is understood that the operators have had difficulty in finding tenants. This may explain the reluctance of promoters to start other units.

In adjacent areas, construction for commercial use is limited and has had no apparent impetus from the Peconic Plant as yet. The exceptions to this are the new retail outlets being built in downtown Riverhead, which can be attributed more to natural expansion than to the new plant.

On the whole, the area has remained rural in character and sparsely settled. Road frontage development is limited to Route 25 and so far has confined itself to a diner and two motels.

Since the economic base of the community has been agricultural in nature, it is necessary to inject the farm picture for the past few years, for it has had a marked effect on the land values above and beyond any reaction attributable to the new plant. As previously stated, the potatoes of

PLATE - III

THE [illegible]CONIC AREA - 1956

[illegible]age 220

Grumman Photo

PLATE - IV

THE PECONIC AREA - 1956

Grumman Photo

PLATE - V

[illegible]

PEQUOTO AREA - 1966

[illegible]

Grumman Photo

PLATE - VI

RESIDENTIAL SUBDIVISION

PECONIC AREA - 1956

Eastern Long Island constitute a large percentage of national production; this vegetable is the major crop in Suffolk County, and available figures put production acreage at about 55,000 acres. In the township of Riverhead there are some 250 farms which account for 28% of the productive acreage of the county.

There are indications that acreage devoted to the potato crop has taken a downward trend, brought about by the elimination in Nassau County of farms taken over for residential development, but at the same time there has been a substantial increase in the yield per acre, because increased use of irrigation permits a more profitable cultivation of the less desirable soil types. Production per acre has been raised from 235 bushels in 1937-1941 to 365 in 1950. Potato production has proven to be a profitable venture, particularly through 1948. However, there have been years during which increased production costs and wide market fluctuations made it impossible to realize a profit. The 1952 crop year, benefiting from the combination of large production acreage, high yield, and record prices, was outstanding. The years 1953 and 1954, through adverse weather conditions and poor markets, reversed the situation. To what extent these two poor years in a row have adversely affected the value of farm land is not fully apparent. However, the number of sales of farms in the 1953-54 and the 1954-55 winter seasons was much smaller than that of previous winters.

While these local factors have had a dominating influence on valuation fluctuations, the general characteristics and trends in both Nassau and Suffolk County have contributed to them also, and they need to be understood in order to weigh the impact of the new Peconic Plant.

PART VII

SUMMARY AND CONCLUSIONS

The phenomenal growth of Nassau County in the past decade has diverted thousands of acres of farmland into housing sites at unit land values far in excess of their agricultural worth. This activity, combined with the industrial growth, displaced farmers who reinvested in farms as far east as Riverhead in Suffolk County. Added to this is the present diversion of farm lands in western Suffolk County by the building boom that has continued to move eastward. The prices paid by the newcomers to eastern Suffolk County were low in comparison with prices received for the sale of land to the west, but above the levels previously existing in the Riverhead area.

The same pressures have operated on land not adapted to agriculture. The fortunes made from speculation in the turnover of land in Nassau County and western Suffolk County have attracted still more speculators in the field. Many of these have reinvested in property in eastern Suffolk County.

During the past three years all of these factors have operated at an accelerated pace. Construction of the new Grumman Peconic Plant brought on a surge of speculative activity in the vicinity of the site. As a result, woodlands that had for years been a static market with prices of $30 to $125 per acre, depending upon soil and location, were converted to an active market with a typical price of $350 per acre; subdivision lots in the nearby residential developments jumped from $450 to $750 per lot, business frontage from $15 to $40 per front foot. Cleared, tillable farm land, close to the Riverhead business section, having a pre-Grumman price of about $600 per acre, jumped to prices of $1,500 to $2,000 per acre.

The announcement in 1953 of plans for the construction of the long-

talked-of Long Island Expressway, extending easterly from the limits of New York City to Riverhead, brought on a new wave of speculation in real estate, particularly in areas to the south and west of the Grumman Plant.

All of these factors have undoubtedly contributed to the increases in the selling price of the poorest quality woodland located to the south of Riverhead and to the south and east of the plant site. During the past twenty years there had been virtually no market for this land, valued in 1950 at $25 to $50 per acre. Thousands of acres went begging at tax sales with no buyers; however, by the summer of 1954 market prices reached levels of $125 to $150 per acre. Current market prices appear to be in the vicinity of $350 per acre, with complete disregard for location or soil quality.

Despite these substantial increases, both in real estate transactions and prices, there is still almost no physical evidence of changed conditions. Seemingly few of the 1300 acres of tillable land in the thirty farms acquired in acquisition of the plant site have been replaced by the clearing of additional lands, and residential development has been limited, as described.

This apparent state of suspended development is not necessarily indicative of things to come. With the improvement in transportation which the expressway will provide, additional permanent residents and new industries seeking to escape the metropolitan pressures to the west will undoubtedly move into the area. When this happens, the lack of adequate community planning and zoning regulation could result in the eventual development of the land surrounding the Peconic Plant to the point where buffer areas would have to be acquired at considerable cost to protect both the public and the

interests of the Government.

It may be possible to solve the problem through the use of aviga-tion easements and/or restrictive covenants to establish protective boundary buffer areas. However, action to obtain this protection should be taken immediately, lest increasing land values render such a plan prohibitive in cost; otherwise the Navy and Grumman may look forward to a repetition of the Bethpage situation in the not-too-distant future.

Pages 228 and 229 deleted.

INTRODUCTION

The Shore Establishment-Community relationship is not predestined from the outset. A constructive beginning will, nonetheless, provide an excellent foundation upon which to build. The limitations of this study, as well as the complexity of the subject, preclude the suggestion that there is a panacea. However, the following discussion will serve to point out certain aspects of the planning and acquisition phases which warrant particular attention.

BASIC SITUATIONS

Generally speaking, there are four basic possibilities: (1) the shore facility ignores the problems of the community, and vice versa; (2) the two parties (shore facility and local interests) establish an informal working arrangement which can be changed at any time by mutual consent; (3) the shore facility acquires in one way or another a "protective" land area around its territory; and (4) the two parties (shore facility and local governmental body) effect a formal cooperation within the framework of a sound program based on mutual understanding and consideration.

Obviously, it is impractical for either party to ignore the other. On one hand, the industrial activity is dependent on the community for its essential services; on the other hand, the community will inevitably be affected and may be greatly benefited by the presence of a successful and stable industry. Consequently, the first plan will only be resorted to under circumstances of extreme necessity.

While the second plan seems to offer a simple and easy solution to the problem, it is subject to serious pitfalls in actual practice. Certainly,

good neighbors can work out a gentleman's agreement which would operate satisfactorily, but this is necessarily dependent upon continuing harmony of the parties concerned. At best this is a makeshift arrangement with doubtful prospects. People do not live forever; friendships have been known to dissolve in disagreements; and a firm basic development plan may never be realized. Finally, it is unrealistic to assume that in the long run either party will forego an economic advantage in order to preserve an informal arrangement.

In circumstances where the industry finds it impossible to develop satisfactory arrangements with the community, whereby its interests are safeguarded, it may be compelled by the economic situation to gain control of enough land to satisfy its foreseeable requirements. In the case of the air facility, which involves airport installations, uncontrolled construction in the perimeter area can nullify its operational usefulness. Hence, in order to protect its investment, the first impulse of the industry might be to acquire all the contiguous land which it could conceivably afford, without regard to any planned development. In view of flight approach patterns, acreage required will be very considerable. The use of restrictive covenants and avigation easements are a means by which land can be controlled without actual purchase. Unfortunately, the acquisition of these rights frequently involves such a heavy investment that it is more economical for the industry to buy the land outright.

In the case of Federal property (assuming Congressional authorization and adequate funds), the industrial planner might be tempted to follow this course. Such a field would, of course, be ideal from the aviation point

of view, but would seem both impractical to the community planner and completely outrageous to the general public. Municipal and school authorities would immediately object, and with some reason, to the loss of income from taxes on the diverted land. Agricultural interests would voice objections to the removal of productive farmland from the local economy. Political ramifications render the acquisition of unlimited areas as protective and buffer strips absolutely unfeasible. And yet, unless future growth is protected in some way, the facility may find itself strangled by peripheral development.

Without a doubt, the most promising approach to a real solution of the whole problem is to strive for formal cooperation based on mutual understanding and consideration. Essential to the success of this endeavor are integrated and comprehensive regulations governing the use and zoning of the entire community. These regulations should derive from a sound master plan based on the needs and interests of all elements of the community, and on the characteristics and limits of the natural resources of the area. The administration of this plan must be entrusted to a single body created by legislative action and empowered with enforcement authority under the general jurisdiction of the courts. Insofar as possible, members should be appointed or employed under such regulations as to obviate political manipulation. Only in this way can the rule of "no exceptions" be effectively enforced.

Although the ideal land use integration is not easily effected, examples of achievements in this direction exist in the Kittimat. Canada, and Stanford, California, developments. Admittedly, these are controlled by private enterprise (Aluminum Company of Canada and Stanford University),

permitting a degree of regulation impossible in general community planning, but the principles involved are the same everywhere. Generally speaking, local governments are not well equipped to carry on such a program.

AN INTERIM SCHEME

Up to the present, at least, the actual functioning of building regulation and zoning programs as applied to the airfield problem leaves much to be desired. An interim solution of the problems confronting the aviation interests can best be achieved through a combination of the basic approaches outlined above.

Until zoning regulation can be depended upon, only that land essential to the actual airfield and its runway end zone approaches should be acquired. However, restrictive covenants or avigation easements should be obtained covering the contiguous influence area (three-mile radius from runways). The restrictive covenant is preferable to the avigation easement in that it "freezes" the use of the land in its present form for a predestined period. For example, under a restricted covenant, farm land remains agricultural and cannot be developed into residential or industrial properties. An avigation easement, on the other hand, does not restrict the type of development, but only imposes a limit on heights.

Little can be done to guard against objections and law suits from those already residing within the three-mile zone of influence. However, future housing and industrial development can be restrained through the use of restrictive covenants. In applying the principles of the restrictive covenant, the "conditions" should not be so unrealistic as to prohibit all human occupancy within the area. Agricultural land can thereby be retained

within the economic structure of the community. This will also assist the establishment of harmonious relations between leaders of the community and industry - a necessary prerequisite for successful development planning programs.

The above scheme has much to commend it inasmuch as the facility's operational requirements are recognized from the very beginning, before peripheral build-up, and thereby exploits the economic advantage of the unimproved land's low value.

ACQUISITION PROBLEMS

The problems and reactions arising from land acquisition by any governmental agency are normally more difficult to handle than those faced by a private corporation. The basic reasons for this lie in the regulations and controls under which the governmental body must act. The private concern, in contrast, is usually free to move unmolested and unhindered, at least to the point in operations where it is ready and willing to make a public announcement of its intentions and program.

The acquisition of land for the Peconic River Facility demonstrated a number of conditions which arise under present procedures:

a. Rumors concerning an impending acquisition are well circulated prior to the notice of taking by the Government.

b. Speculators, basing their actions on the rumors, promptly purchase land in the area.

c. Because of this speculative activity, owners consider the official appraisals unrealistic.

d. The communities resent removal of the land from the local tax rolls.

The first three of these reactions can be attributed directly to the requirement that the Government obtain an on-site appraisal of the proposed condemnation before submitting the project to higher authority for approval. The fourth condition is due to the Government's nonrecognition of the local governmental body's interest in the land - a silent partner of the land owner so to speak.

APPRAISALS

Government land acquisition in its preparatory stages is classified confidential. This is necessary to prevent speculative influences from adversely affecting market valuations. On the other hand, appraisers making on-site inspections must identify themselves and at least partially explain their intended purpose before land owners will permit them on the property. Even though there has been no detailed information released, the land owners' knowledge that the Government is interested in their land is sufficient cause for uneasiness, rumors, and speculation. Whatever the land's value the day before, it is now higher. No matter how experienced and skillful he may be, the appraiser cannot accurately predict this fluctuation. His report, therefore, can only reflect the market value at the time of his on-site inspection.

This "leak" is unnecessary. An equally satisfactory estimate can be made by the appraiser without actually going into the area. An experienced local appraiser will already know the land's approximate value from his knowledge of the region's real estate history. Detailed coverage of the improvements can be obtained from aerial photographs. The resultant appraisal will not vary appreciably from that of the present method and has considerably

more merit, inasmuch as there can be no occasion for disclosure of intentions and the market remains undisturbed. In this way acquisition procedures (negotiations and/or filing of notice of taking) can be initiated simultaneously with the first official public announcement of Congressional approval of the project. True, the estimate will not be infallible (the present method is similarly defective), but it does permit the Government to enter a quiet, rather than a turbulent, market situation.

THE EXCLUDED PARTY

Taxes are not normally affected by the transfer of property from one owner to another. The new owner continues to pay local charges based upon assessed valuations. Such a procedure insures a continuous source of revenue to the local governmental body to support its regular operations. The local governing body therefore possesses a definitely established interest in the land. However, upon acquisition, Government property is immediately removed from the local tax roles. There is no reparation made for this severance of interest. The argument that Government projects bring with them new money which stimulates and strengthens the area's economy dodges the real issue.

Correction of this inequity will serve to relax the growing resistance to Government acquisitions. However, it is not to be inferred that the land should remain on the tax rolls and the Government pay taxes to a subordinate body. Rather, it is suggested that settlement be in the form of a lump-sum payment determined either by direct negotiation or court judgment.

SUMMATION

Airfield planning concepts should be expanded to satisfy not only the obvious requirements of ground operations (i.e., buildings, ammunition storage, runways and approach zones, etc.), but also the three dimensional space requirements of low-level, high-speed jet aircraft operations within a three-mile radius of the field. The "restrictive covenant" principle would appear to hold great promise in this respect and is recommended for serious consideration.

On-site examination of property by Government representatives prior to official announcement of acquisitions should be discontinued. The substitution of aerial photo-reconnaissance methods for this work is recommended inasmuch as it will produce equally satisfactory results in evaluating topographic features and man-made improvements. This will enable the Government to negotiate with land owners in an atmosphere free of rumor and speculation.

Current laws should be revised to recognize the local governmental body, as well as the actual land owner, as a party to land acquisitions. Such recognition should be in the form of a lump-sum settlement as reimbursement for loss of revenue through removal of the property from the local tax rolls.

APPENDICES

APPENDIX A

METHODOLOGY

The authors have been encouraged by their advisers to include, as an addendum, a short description of their organization and experiences incident to the investigation and preparation of this monograph. Possibly those who follow may find this of value in subsequent studies of a similar nature.

SELECTION OF SUBJECT

At first it was contemplated that the project would include a variety of naval installations in various settings - for example, a shipyard in a metropolitan community, an air station in a suburban community, an ammunition depot in a rural area, and possibly others. In discussing the project with those more experienced in these matters, and after attempting to outline the subject in this form, it was soon recognized that the original scheme was much too ambitious. Time and available resources dictated that the project be reduced in scope to a particular installation relatively free from the intangible and complicating influences of a large metropolitan area. Although not essential, it was desirable that the installation be conveniently accessible to the authors from Princeton.

Navy Department cooperation in the project was obtained through correspondence from the Chairman of the Civil Engineering Department, Princeton University, to the Chief of the Bureau of Yards and Docks. This was followed by a visit by the authors to the Bureau, at which time it was suggested that an appropriate case study would be that of the growth and development of the Grumman Aircraft Engineering Corporation in Long Island.

Through the services of the Bureau of Yards and Docks, the project was cleared with representatives of Grumman and the Bureau of Aeronautics.

Upon returning to the University, concurrence in these arrangements was obtained from the faculty advisers. Confirmation of the earlier telephonic agreement with Grumman was then made by a letter from the authors requesting the opportunity of a meeting for the purpose of discussing the project in detail.

PRELIMINARY WORK

At this stage the project was little more than an idea in the minds of the authors - it had no direction. It was essential, therefore, that a plan be developed so that the study could be intelligently implemented. To this end a detailed outline and a series of questions for investigation, see Appendix B and C, were prepared. At the same time a work progress schedule, see Appendix D, was prepared. This was of invaluable assistance in the execution of the study.

COLLECTION OF DATA

The initial conference with Grumman, like all introductions, was considered to be extremely important. Naturally, the company's cooperation was essential to the study's success. The outline and questions served an important function in this respect for they provided Grumman with a concise picture of the scope and nature of the study, and, even more important, established a common ground for discussion.

During the conference, which lasted several hours, each question was discussed in detail. On some points Grumman frankly advised that

information would not be available, for others appropriate sources were recommended, and the remainder of the questions were retained for further study and development. In this way the authors were able to establish immediately the areas in which they would have to concentrate their efforts.

A form letter was then prepared (Appendix E) and sent to all recommended and possible sources of information with appropriate changes in the context to fit the background of the recipient. Where practicable, every response was followed through with a personal interview. As was to be expected, some contacts were more productive than others, and frequently they referred to other possible sources. Eventually the point was reached where recommended sources had already been interviewed. We felt this a good indication that the field had been covered.

Various public agencies and local planning bodies revealed in their responses that much of the available statistical information is of questionable value for comparative purposes. For example, the most dependable source for area population figures was found to be the Long Island Lighting Company. The difficulty in working with Federal census data is caused by such factors as the variations in tract delimitations from one census to the next. To track these facts down and assemble the available information meant, of course, numerous letters and considerable travel on the part of the authors. The entire Spring vacation was spent commuting daily to New York City and Long Island, with a trip to Washington, D.C. on the side. During this phase of the work the authors were furtunate in being able to use the offices of the District Public Works Officer at 90 Church Street as their New York base of operations.

It is interesting to note the rather unusual and circuitous routes that had to be followed in the collection of some data. It had been expected originally, for example, that Grumman would know where its employees lived. This proved not to be the case for Grumman is only interested in the fact that its employees live on Long Island - not their distribution within the community. How to demonstrate this distribution posed a problem until it was learned from an independent source that the Government Statistical Corporation had complied a tabulation by school districts (those that had requested Federal assistance) of public school pupils whose parents worked on Federally-owned properties. A portion of the Grumman employees come under this parental category; therefore, it was possible to construct at least part of the picture.

PREPARATION OF MANUSCRIPT

The day finally arrived when we could devote no more time to field work. It was necessary to begin writing. For several days efforts in working from the original outline were unsuccessful. This was due, for the most part, to the discontinuous and patchy nature of our information. It could not be broken down chronologically so that finite comparisons between periods of growth of industry and community could be made. It was thereupon decided to treat each component of the study individually. As indicated in Appendix F, the reader's thoughts are carried progressively from the broad over-all picture down to sharp focus on the specific problem.

This procedure had the additional advantage of permitting the authors to divide the work in "pre-packed" units. Lt. Cahill is a native of Long Island and it was only natural that he handle the Area and Reactions

parts. Lt. Klingenmeier, by process of elimination, fell heir to the remainder. The Summary and Conclusions was a combined effort - one wrote the rough draft and the other smoothed out the wrinkles.

The manuscript was then edited and submitted to the faculty advisers and Grumman for their review, suggestions, and comments. After the necessary revisions and corrections the thesis was published.

SUMMARY

A study of this nature is dependent for its successful prosecution not only upon the assiduous application of the student, but also upon the interest instilled in the many persons whose cooperation, in one form or another, is required. The authors consider themselves extremely fortunate in this respect for they were met at almost every turn with helpful assistance and guidance. In retrospect, the success of this study is attributed to four equally important factors:

1. As far as the authors were able to determine, this was the first such study made in the Long Island area.

2. Those contacted recognized the possibility of the study's direct application to their particular field of interest.

3. The study was directed towards a current situation involving a major industrial component of the area's economic structure.

4. The project was sanctioned by the Grumman Aircraft Engineering Corporation, the Navy, and Princeton University.

APPENDIX B

Tentative Outline

The Environmental Growth of the Naval Shore Establishment

A study of the growth factors and the inter-relationships
peculiar to the Naval Shore Establishment
and its adjacent community

Preface

I. History and growth of the Naval Shore Establishment

1. What is the Naval Shore Establishment and its function

2. Initial establishment and growth through technical advances in ship construction and armament

3. Advent of aviation and its requirements

4. Expansion of the Naval Shore Establishment with respect to operations, personnel and land requirements and the increasing economic and social impact on the surrounding community

5. Evolution of Military Industrial Facilities as a part of the Naval Shore Establishment

6. Grumman's position in the Naval Shore Establishment

II. History of Grumman development

1. From founding to WW II (1939)
   a. Production history
   b. Geography of the area
   c. Population of the area
   d. Social and Economic characteristics of the area
      (1) Industry and Employment
      (2) Transportation
      (3) Housing
      (4) Health
      (5) Education

2. Period 1940 - 1945 (WW II)
   a. Production expansion
   b. Population movements
   c. Community development including social and economic changes:
      (1) Industry and Employment
      (2) Transportation
      (3) Housing
      (4) Health
      (5) Education

3. Post-War adjustment (1945 - 1950)
   a. Production
   b. Population
   c. Community development including economic and social changes
      (1) Industry and Employment
      (2) Transportation
      (3) Housing
      (4) Health
      (5) Education

III. Expansion Period 1950 - 195? and its Implications

1. Impact of the Korean Incident on production

2. Production requirements dictating expansion of facilities

3. Problems encountered

4. Estimate of the situation - requirements and available resources

IV. Expansion and Relocation of Plant Facilities

1. Initial studies - site, operational requirements, economic factors, etc.

2. Sequence of operations including coordination with local bodies, etc.

V. Area in Change - New Plant Area

1. Geography of operations - new plant area

2. Population

3. Social and Economic:
   a. Community services and functions
   b. Industry and employment
   c. Transportation
   d. Housing
   e. Health
   f. Education

VI. Summary and Evaluation

1. Factors Favorable Influence Unfavorable Influence

VII. Future Guides in Military Industrial Development and Their Use

VIII. Conclusions and Recommendations for Further Study

APPENDIX C

Points for Inquiry

I. BETHPAGE

1. What was and is the relationship between Grumman and County and State organizations with respect to:

a. Coordination with governmental bodies regarding solution of mutual development problems:

(1) Zoning and avigation requirements

(2) Community services and facilities - police protection, fire protection, recreational facilities, utilities, taxes, etc.

(3) Planning and development of mass transportation and highways - overhighway delivery of sub-assemblies and personnel access between residential areas and plant.

(4) Health and welfare - water shortages, industrial pollution, and detrimental effects of industrial and residential developments on sanitary facilities.

(5) Company participation in local community life - hospitals, social services, etc.

2. Status of employees and comparison to population of the area of influence:

a. Numerical comparison of the Grumman working force with sub-contractor working force to make up coordinated productive effort.

(1) Grumman employees - where did they come from, previous income level, previous status (rent or home-owner), where do they live now, present income level, home-owner or rent,

time and means of commuting to work, age groups by sex, educational status.

(2) Subcontractor employees - (similar information as above).

b. Comparison of Grumman employees with the community as a whole:

(1) Age (M&F) grouping of area vs. age (M&F) grouping of Grumman as a function of percent of totals.

(2) Average hourly wage of Grumman vs. area (is data at hand) for period of Grumman's existence.

(3) Average educational level of Grumman employees vs. area (is data at hand for period of Grumman's existence).

(4) Percentage of home-owners in Grumman vs. area (data?)

(5) Percentage of renters in Grumman vs. area (data?).

(6) Participation of Grumman employees in civic affairs.

(7) Area population distribution with respect to retail or shopping centers and Grumman employee density distribution.

3. Industrial Growth

a. Area land use history

b. Land valuation history

c. Initial Grumman plant facilities and their expansions

d. Inception of subcontracting in production plans of Grumman

e. Extent of subcontractor facilities:

(1) Locations - was Grumman location a factor in their site location.

(2) Size of facilities

(3) Number of employees - how does this affect labor market

(4) Method of product delivery

f. Establishment and growth of industry in the area (general industrialization)

(1) Factors for their location in area

(2) Size of facilities and relation to Grumman

(3) Number of employees and effect on labor market

g. Effect of industrialization on previous occupational and social patterns:

(1) Land use changes and relocation of residents

(2) Decline of previously established industries

(3) Reaction of previous residents to in-migration of new workers

(4) Development stages of community facilities in order of establishment or where did people go for these services if not provided - police, fire, public utilities, retail outlets, schools, hospitals, recreation

h. Controls established for community and industrial growth and how effective were they

4. Motivating factors dictating expansion and inadequacies of Bethpage site and plant.

a. Production requirements vs. available facilities

b. Community growth with respect to plant site and its effect on company operations and expansion

c. Land values

d. Relationships between Grumman and community interests - business, residential, and governmental

e. Factors of the decision to move

II. CALVERTON PLANT

1. New plant study
   a. Site, operational and production requirements
   b. Sites studied and factors considered - land values, land use, area occupation and social structure, etc.
   c. Coordination with governmental (Navy, state and county planning commissions, etc.) agencies in studying the problem
   d. Considerations dictating final selection (including presence of AEC and others in vicinity)
   e. Scope of planned facilities (include community type projects?)
2. Initial phases
   a. Implementing organization
   b. Coordination with governmental agencies
   c. Preparation of local interests to receive plant - who and why contacted
   d. Relation with land owners
   e. Reactions of local interests:
      (1) Real estate:
         a. Rumors and speculation
         b. Land value fluctuations
         c. Sub-division promotion activities
      (2) Commercial
      (3) Industrial
      (4) Community leaders

(5) Displaced land owners

(6) Old residents of vicinity

f. Acquisition of property

3. Construction phase

a. Description of work to be done and area affected

b. Contractor labor force and period of operation - number of local residents hired and number of in-migrants, trade classifications

c. Community assimilation of in-migrants - housing, social

d. Impact of increased money circulation on local economy

4. Transition phase

a. Length of time and operations involved

b. Personnel involved:

(1) Managerial

(2) Permanent working force (advance party)

(3) Transient working force

(4) Situation of the above personnel:

(a) Housing - type and location

(b) Method of commuting - mass transportation, company bus, automobile

(c) Adjustment within the community

c. Advance preparation on the part of the company and the community to provide necessary services for incoming permanent working force

d. Activities of local interests to exploit situation

e. Unforeseen difficulties arising from:

(1) Local inertia to community planning

(2) Problems arising from multiple jurisdiction over community functions - school, fire, police, etc.

(3) Nonadherence to zoning controls, if existent

(4) Inadequacy of subdivision regulations, if existent

5. Commencement of production

a. Physical changes

(1) Permanent working force influx - number with and without families moving into area, number commuting from old locations

(2) New construction - housing, retail outlets, highways, etc.

(3) Planning and development of mass transportation and highway

(4) Health and welfare - water shortages, industrial pollution, and detrimental effects of industrial and residential development on sanitary facilities

(5) Company participation in local community life - hospitals, social services, etc.

b. Status of employees and comparison to population of the area

(1) Numerical comparison of working force

(2) Where did labor come from, previous income level, home-owners or renters, where do they live now, present income level, home-owner or renter, time and method of commuting to work, age groups by sex and educational status

(3) Age (M&F) grouping of area vs. age (M&F) grouping of Grumman as a function of percent of totals

(4) Average hourly wage of Grumman vs. area (is data at hand)

(5) Average educational level of Grumman vs. area

(6) Percentage of home-owners vs. area

(7) Percentage of renters vs. area

(8) Participation of Grumman employees in civic affairs

(9) Area population distribution with respect to retail or shopping centers and Grumman employee density distribution

6. Estimate of the Calverton situation (Riverhead Area)

a. Centers of employment

b. Land use

c. Variations from previously established growth patterns

d. Community functions and services

(1) Existing

(2) Recognized requirements not yet provided for but planned when resources become available

(3) Possible future requirements based upon indicated trends

e. Comparison of situation with that of similar Bethpage era

(1) Presence of governmental planning body

(2) Ownership (sponsorship) of plant

(3) Market situation

(4) Technological aspects

f. What is being done to provide for future needs of Grumman plant and adjacent community to prevent recurrence of Bethpage situation

APPENDIX D

WORK PROGRESS SCHEDULE

	March				April				May				June	
	5-10	11-17	18-24	25-31	1-7	8-14	15-21	22-28	29-5	6-12	13-19	20-26	27-2	3-9	10-16
Field work & assemble data	x x x x x x x x x x x x x x														
Rough draft			x x x x x x x x x x x x x												
Edit							x x x								
Review - Advisers & Grumman								x x x x x							
Revisions									x x x x						
Typing										x x x xx x x x x x x x x x					
Reproduction & binding													x x x x x x x x x x x x		

(1) Bound copies for Princeton University and U. S. Naval Postgraduate School to be ready first week in June.

APPENDIX E

11 March 1956

Dear Sir:

The Civil Engineer Corps of the Navy has for the past several years sponsored a graduate study program at Princeton University for certain of its career officers. This year Lt. _____ and I are participating in the program.

Because of our interest in industrial planning and development, we have selected to study for our joint thesis the growth factors and inter-relationships peculiar to an element of the Naval Shore Establishment and its adjacent civilian community. Our case study will be the recent expansion of Grumman Aircraft Corp. to the Naval Industrial Reserve Facility at Calverton.

An analysis of this development would be incomplete if it did not include the parallel industrial and community growth of eastern Nassau and Suffolk Counties. It is thought that your organization may be able to provide certain information documenting this growth from the '20s to the present. We are interested in statistical data and material broken down by town or township covering past growth (5 or 10 year increments), present status, and future trends on the following subjects:

1. Population (age - sex and distribution)
2. Transportation (mass transportation and highways)
3. Tax structure (industrial, commercial, residential, non-taxable and public)
4. Labor supply:
    a. Occupations (professional, managerial, clerical, skilled, and unskilled)
    b. Age and sex
    c. Education
    d. Income
    e. Density distribution
5. Industrial growth and, where occurring, decline
6. Commercial growth and, where occurring, decline
7. Public utilities
8. Public health facilities
9. Educational facilities
10. Recreational facilities
11. Zoning (airfield, industrial, commercial, residential)
12. Residential subdivision regulation

13. Land use and land values
14. Effect of industrialization and urbanization on previous occupational and social patterns
15. How did local community and industrial interests cooperate in guiding these changes, see #14 above
16. What are the areas (indicate on map) of responsibility, date of establishment, and function of each of the governmental planning bodies within Nassau County
17. Are present zoning and subdivision regulations adequate for present and foreseeable needs
18. What has been the program of the County Commission with respect to individual community development - especially in the Bethpage area
19. To what extent have the mutual development requirements of both industry and the community been recognized by the respective leaders and what is being done to solve existing and foreseeable problems.

It is believed that much can be learned from this study which will be of value to both the writers and organizations such as yours. Possibly you have suggestions and data on some aspects which we may have overlooked. Should you find it convenient, therefore, we would welcome the opportunity of meeting with you and discussing our project.

What assistance you can give us in this study will be most appreciated.

Respectfully yours,

APPENDIX F

REVISED OUTLINE 4/6/56

PART I. The Shore Establishment

I. Introduction

PART II. The Area

I. Nassau
II. Suffolk

PART III. The Industry

I. Aircraft industry in general
II. Grumman Aircraft Corporation (History and Structure)

PART IV. The Problem

I. Industry
II. Grumman

PART V. A Solution

I. The Plan
II. Implementation

PART VI. Area Reactions

I. Suffolk County - (Riverhead area etc)

PART VII. Summary and Conclusions

APPENDIX - Methodology

APPENDIX G

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APPENDIX H

LIST OF CORRESPONDENCE AND CONSULTATIONS

Nassau County Planning Commission, March 1956.

Suffolk County Planning Board, March 1956.

Mr. John L. Barry, Director of Civilian Devense, Suffolk County, N. Y., March 1956.

Mr. James W. Carpenter, Vice President, Long Island Lighting Company, March and April 1956.

Mr. John F. Denning, Regional Manager, New York State, Dept. of Commerce, March and April 1956.

Grumman Aircraft Engineering Corporation, Bethpage, L.I., N. Y., January through April 1956.

Dr. William Leonard, Director, Bureau of Business Research, Hofstra College, March 1956.

James L. Niland, Real Estate Valuation Expert, 215 Montague Street, Brooklyn, New York, March 1956.

Mr. G. McKim Norton, Vice President, Regional Plan Asso., Inc., New York, N. Y., March 1956.

Mr. Robert Seebol, Senior Economist, Division of Employment, New York State Department of Labor, March 1956.

Mr. Fred Tilney, President, Governmental Statistical Corporation, New York, N. Y., March and April 1956.

Mr. W. E. Zimmermann, Director, Bureau of Business Research, State of New York, Dept. of Commerce, April 1956.

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